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THE PSYCHIATRIC QUARTERLY

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THE PSYCHIATRIC QUARTERLY

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SOME OBSERVATIONS IN THE TREATMENT OF DEMENTIA PRAECOX WITH HYPOGLYCEMIA

BY MARCUS SCHATNER, M. D., AND F. J. O'NEILL, M. D.,
CENTRAL ISLIP, N. Y.

PART I

Clinical Observations

During the past year hypoglycemic treatment, according to the method of Dr. Manfred Sakel, has been instituted in different parts of the United States and all over the world. Many enthusiastic reports have been published and most of the writers claim extremely favorable results. One of the present writers had the privilege to attend the course given by Dr. Sakel at the Harlem Valley State Hospital, and subsequently this method of treatment was employed at the Central Islip State Hospital. The writers do not intend to go into the details of Dr. Sakel's technique. They have had experience with 75 patients. The treatment of 56 of these patients has been completed and the treatment of the remainder is continued. They have managed over 3,500 hypoglycemic states and believe that their observations may be of some interest to other physicians who are employing this type of treatment. At the outset, it should be stressed that the method and technique employed, adhered strictly to the teaching of Dr. Sakel during the course given at Harlem Valley State Hospital. The duration of the psychosis in these cases varied greatly from one month to 12 years. The average duration for the total series was three and one-half years. It can be observed from this that the majority of cases employed were not, according to Dr. Sakel, ideal for hypoglycemic treatment.

Physical Setup

As this treatment was never employed in State hospitals before, a new department had to be created and nurses trained for that purpose. Our insulin unit consists of two adjoining, 10-bed wards and six single rooms. This unit is employed exclusively for the treatment and after the patients are taken out of the hypoglycemic states, they are brought back to their respective wards. We found that one doctor can take care of 10 or 12 patients at the most and

that a hypoglycemic unit like ours needs six nurses. This requires two nurses for seven patients. Of course, in the first two hours of the treatment, one nurse can take care of five or six patients and, as time goes on, more nurses are necessary but the writers believe that with suitable management, two nurses can easily take care of seven patients. Occasionally it was necessary to have a special nurse for one or another patient. Most of the patients are treated in the ward but quite frequently it was necessary to place some patients in single rooms as their state of excitement disturbed the rest of the patients. In some cases, psychological considerations had to be taken into account and patients kept in single rooms. Whenever necessary, a protection sheet was employed for those patients who became restless and were likely to fall out of bed. Even in cases where we employed one nurse for a patient, we had to employ this sheet, as patients in a semicomatose condition may fall out of bed even while the nurse is in close attendance. This sheet consists of a rectangular piece of heavy canvass, 30 inches long and 40 inches wide and has three heavy straps, each 30 inches in length, on each side, by which the sheet can be fastened to the frame of the bed so the arms, legs and most of the trunk are free. This sheet merely protects the patient from falling out of bed, yet does not restrict motions of the extremities or of the body. In several instances it was necessary, when the patient became extremely excited, to employ regular restraining sheets during that stage. We usually start our treatment at 7 o'clock in the morning. As the majority of the patients are in bed from five to six hours. it seemed advisable to start the treatment early in the morning. The patients are taken to the hypoglycemic ward before the other patients receive their breakfast and in this way the possibility of obtaining food from other patients is greatly diminished. Likewise the patient does not remain in bed during the entire active part of the hospital day and has a chance to participate in hospital activities or do some work in the occupational therapy class.

Sugars Employed for Terminating Hypoglycemic States

All hypoglycemic states are interrupted by nasal tube feedings of a sugar solution. In some of the cases, a concentrated solution of glucose intravenously is also employed for rapid termination.

At the beginning of the treatment the writers had to use a 50 per cent solution for rapid termination and in five cases sclerosis of the veins developed which greatly interfered with further treatment. Since 33 per cent glucose is now available on the market, it is sufficient to be used for rapid termination. This concentration is easier to inject into small veins and repeated injections are not as apt to cause sclerosis of veins. At first a solution of sucrose was employed for the nasal feedings. It was found, however, that better results were obtained when ordinary unrefined brown sugar was employed. This sugar has been used by the authors for the past six months. The amount of sugar administered depends upon the amount of insulin injected, usually one gram to one unit of insulin is found to be sufficient. However, to some of the patients, who for one reason or another refuse to take sufficient nourishment after they are taken out of the hypoglycemic state, usually one and one-half grams of sugar to each unit of insulin is given in the tube feeding in order to give these patients larger reserve of sugar. In some patients, although they absorbed the sugar quite quickly, glucose intravenously was indicated for mental reasons. We observed several patients who were restless, disagreeable, uncooperative and refused to eat their meals when the hypoglycemia was interrupted by nasal tube feeding. However, when glucose intravenously was given to the same patients, they were pleasant and agreeable, and ate their meals more readily.

Insulin Dosage and Its Relation to Coma and Convulsions

It is well known that the coma does not depend upon the insulin dosage as there are many organic and mental factors at present not well understood upon which the coma depends. In our series of cases, we achieved coma in one of the patients with 15 units of insulin; in another patient 400 units did not produce coma, although the blood sugar level during the hypoglycemic state dropped to 20 mgms. In 23 of the cases, the insulin dosage could be decreased from 5 to 170 units and still achieve coma. It has been our experience, however, that in most of the cases we had to increase the dosage in order to achieve coma. Some of the cases, after they had a certain series of comas, stopped going into coma

and further increase of insulin did not produce coma. We observed in one patient, in whom the first coma was achieved with 55 units of insulin, that reduction of dosage to 35 units, still produced coma. The patient, for no apparent reason, stopped going into coma. The dosage was then gradually increased and, although she received as much as 220 units of insulin, she did not go into coma again. Another patient, who went into coma the first time with 100 units of insulin, stopped going into coma and required continuous increase of insulin and when 175 units were reached, he went into coma but stopped going into coma and again required higher doses of insulin. Finally, even 320 units did not produce coma in this patient. In some cases, only one or two comas were achieved, regardless of the amount of insulin administered. We came, therefore, to the conclusion that there are many unknown factors interplaying which produce coma. We further observed that in the first few days of the treatment, the patients developed good appetites and ate ravenously. However, with the increase of the insulin dosage, the appetite diminished and finally, when around 200 or more units of insulin were given, a few patients developed pains in the abdomen, could not eat well and, after they ate, vomited their meals. It was, therefore, necessary to give them 10 to 15 drops of 1-1000 solution of atropin. When they ate half an hour later, they still complained of pain and frequently vomited their meals, were restless for the remainder of the day and the next morning they objected to the treatment. For this reason we feel that, at least in our series of cases, it was better not to increase the insulin doses over 200 units.

The writers could see no definite relationship between the dosage of insulin and the convulsive seizures. In our 75 cases, 39 of whom were males and 36 females, we observed convulsions in 6 females and in 17 males. Of these 6 females, 2 had 1 convulsive seizure, one had 2, 1 had 3, 2 had 4. In the male patients, 8 had 1 convulsive seizure, 4 had 2, 2 had 5, 1 had 6, 1 had 7, 1 had 8. It is interesting to note that one of the male patients, who had two convulsions, had his first one when he received 225 units of insulin and the second after the dosage was gradually decreased and while he was in the fourth phase of his treatment, when he received 30 units

of insulin. This latter seizure occurred one and one-half hours after the injection. Another patient, a female, had no seizures while receiving the shock dose of 75 units, yet experienced a convulsion when receiving 20 units. This occurred one and three-quarter hours after the insulin injection. The male patients usually required higher insulin dosage in order to obtain coma and this may account for the fact that there were more convulsive seizures in males than in females. The convulsive seizures usually came on suddenly but on rare occasions the writers could predict that the patient would probably develop a convulsion on that day, as the patient was unusually restless and behaved differently during the hypoglycemic states than on the previous days of treatment. The convulsions came on suddenly, from an hour and 10 minutes to about four and one-half hours after the injection. One male patient, who had four convulsions, had all of them shortly after the hypoglycemic states were interrupted by nasal tube feeding. In over 3,500 hypoglycemic states we observed 62 convulsive seizures in 23 patients.

Of the 56 patients whose treatment has been completed, 4 females and 15 males had convulsions. Of these 4 females, one who had 4 convulsions is much improved; one with 4 convulsions is improved and two with 2 and 3 convulsions, unimproved. Upon analysis of the convulsive seizures in the 15 male patients, we find that one male patient who had two convulsions is recovered; three patients with 1, five and eight convulsive seizures are much improved. Of eight patients who are improved, five had 1 convulsion, two had 2 and one had 5. The three patients in this group who are unimproved had seven, two and one convulsions, respectively. The writers did not see any immediate improvement after a convulsion and believe that, at least from their experience, there is no relationship between the improvement of patients and the occurrence of convulsive seizures.

Complications

(a) Respiratory Complications.

The authors observed several of the complications mentioned by Dr. Sakel in his writings. In our series of cases, we observed re-

spiratory complications quite frequently and in these patients we could not achieve deep coma with areflexia as the above mentioned complication necessitated early termination of the hypoglycemic states.

The respiratory complications may be due to two types of factors—local and central. During the hypoglycemic state almost all the secretions of the body are increased. Frequently the secretions in the bronchi are greatly increased and rales in the chest become audible. When this condition becomes extreme, the patient shows respiratory distress which can be combated only by interruption of the hypoglycemic state. As the hypoglycemic state progresses, we see in connection with other central irritations, a marked irritation of the respiratory center. Cheyne-Stokes breathing; inspiratory stridor; irregular, extremely rapid or extremely shallow and superficial breathing are quite common. All these respiratory complications necessitate the termination of the hypoglycemic state.

During the hypoglycemic period, it was observed that many of the patients salivated profusely and as the depth of coma increased, the danger of aspiration of saliva became greater. To combat this, such patients were usually placed on their side and the saliva gently expressed from the mouth by pressure on the cheeks. Elevation of the foot of the bed was sometimes helpful. In a few cases, aspiration was observed resulting in labored breathing associated with cyanosis. This condition was usually overcome by lowering the patient's head over the side of the bed and vigorously slapping the thoracic region of the spine. In only two cases was any serious complication observed following aspiration. One patient, a female, vomited during the hypoglycemic period and developed aspiration pneumonia which cleared up uneventfully. The second patient was a male, age 36, who had had 22 treatments and 12 comas. On the twenty-second day of treatment the hypoglycemic state was interrupted as usual by nasal tube feeding. Immediately after withdrawal of the tube, the patient vomited and apparently aspirated some of the sugar solution. He was immediately given intravenous glucose (as is our practice in such complications) and the hypoglycemic state terminated. He rallied but

on physical examination coarse, moist rales were audible over both sides of the chest. That evening he was found to have consolidation of the middle and lower lobes of the right lungs, a high temperature (103.6°) and the other symptoms and signs of pneumonia. The patient ran a typical course of lobar pneumonia with the crisis on the seventh day. Type I pneumococcus was found in the sputum. The disease was complicated by empyema. The patient expired on the seventh day during the crisis. Postmortem examination was refused. A few of our patients, for no apparent reason, vomited during the hypoglycemic period. On several occasions it was necessary to terminate the hypoglycemia because of this complication. Recurrence was usually counteracted by administration of 15 to 20 drops of 1-1000 solution of atropin by mouth before the institution of treatment. It was observed that vomiting frequently occurred in those patients who were able to secure food in the morning before treatment. It can easily be seen that there is considerable hazard involved, as aspiration of vomitus can readily cause pulmonary complications. On several occasions patients were observed to awake fully following interruption of hypoglycemia and yet be unable to retain food. Administration of atropin by mouth or by hypodermic had little effect upon the vomiting. However, after a few hours rest in bed the vomiting subsided and the patient was able to take food.

Three patients, one female and two males, developed pulmonary edema. Immediate administration of intravenous glucose alleviated the condition and they recovered without sequelae.

Laryngeal spasm was observed in two male patients, in one when he had 45 and 40 units of insulin, respectively, and in another patient when he had 100 units of insulin. This condition was alleviated quite rapidly by adrenalin administered subcutaneously and termination of the hypoglycemic state with glucose intravenously. These patients were subsequently given larger doses of insulin, without recurrence of laryngeal spasm.

(b) Neurological Complications.

The most frequent neurological complication seen was a temporary facial paralysis. This occurred on five occasions and was of short duration. In no case did it last longer than 20 minutes

and all disappeared soon after the termination of the hypoglycemic state. It is felt by the authors that the appearance of a facial paralysis during treatment is an indication for interruption of the hypoglycemia. Two patients developed paralysis of extremities. One, a male, developed a paralysis of the right arm which disappeared in 20 minutes and was accompanied by a motor aphasia which persisted for about an hour. The second case, a female, developed a paralysis of the right arm and right leg which persisted for about three hours but it disappeared with no residual. The female patient who developed the paralysis of the right arm and leg, also on two other occasions, developed a motor and sensory aphasia which persisted for about an hour and a half but was not associated with any evidence of paralysis of any other part of the body. Three instances of diplopia were observed in two patients, both females. These patients complained of double vision after the interruption of the hypoglycemia. This symptom, however, disappeared after about 20 minutes. Another male patient developed an aphasia for a period of about 48 hours.

An anaphylactic reaction was observed in one female patient. This occurred on her twenty-third day of treatment, when she was receiving 85 units of insulin. It occurred about one hour following the intramuscular injection of insulin and was manifested as a diffuse urticarial eruption, not associated with constitutional symptoms. In this case, adrenalin subcutaneously was administered and the hypoglycemic state interrupted. The rash disappeared fully an hour after the interruption of hypoglycemia. On the following day the patient was given a sensitivity test by intracutaneous injection of well diluted insulin. No sensitivity was noted and increasing doses of insulin were administered until she had received her usual dose of 85 units. This patient, following this reaction, has received 25 injections of insulin with no recurrence of the urticarial reaction. It is noted that the same brand of insulin has been used throughout the treatment.

On three occasions, delayed hypoglycemic reactions occurred after the patient had taken a full meal following the termination of hypoglycemia. All of these occurred about four hours after the hypoglycemic state was terminated and required intravenous in-

jection of glucose. One patient, who had not eaten well following termination of treatment, developed a convulsive seizure about four hours later and required intravenous glucose. Four other patients showed recurrence of hypoglycemic symptoms following the treatment, on days when they did not eat well. This was easily combated by oral administration of sugar solution. These delayed reactions were usually observed in patients who received high doses of insulin or in patients who failed to eat sufficient carbohydrate following the treatment. No serious after-effects were noted in these patients. It can be observed from this that the taking of sufficient carbohydrate after interruption of the hypoglycemic state is quite essential. Tube feeding to insure a sufficient carbohydrate intake may be required in certain cases.

Five of our patients developed typical hunger rows with psychomotor excitement during the hypoglycemia. These reactions were observed to occur usually in the first few days of the treatment when low doses of insulin were administered. The administration of food alleviated the excitement and terminated the condition. One of these patients developed this reaction on three occasions, the other four on two occasions.

(c) Injuries to the Tongue and Lips.

The general muscular spasm occurring in the precomatose period was often associated with a spasm of the muscles of mastication. During this stage several of the patients received injuries of the tongue and lips as a result of inclusion of these parts between the teeth. Injury to the tongue was usually prevented by placing a heavy tongue depressor between the teeth. However, on some occasions this did not prevent the patient from biting his tongue. Three patients received rather severe lacerations of the tongue. One of them, a male patient, inflicted a series of deep lacerations at the anterior third of the tongue and for some time it was expected that part of the organ might be lost. However, following six days of rest the wound gradually healed and the treatment was resumed. In this individual the spasm of the muscles of mastication occurred so rapidly and was of such intensity that it was impossible to free the tongue from the teeth except by rapid termination of the hypoglycemic state by administration of intravenous glucose. Two

other male patients also received rather severe, repeated lacerations of the tongue. However, the treatment was resumed after a few days of rest. In one of these cases it was necessary to reduce the dosage of insulin, following which no further injury of the tongue was noted. Several other patients received minor injuries of the tongue and lips. However, in none of these was it necessary to stop the treatment for any period of time.

(d) Cardiovascular Complications.

All 75 patients treated in this hospital were completely digitalized at the beginning of the treatment as advocated by Dr. Sakel. Two of the patients treated were suffering from old mitral lesions but were well compensated. The remainder of the patients had no cardiac involvement that could be detected without electrocardiograph studies. Cardiovascular complications were not frequently observed in this series of cases. Alteration of the pulse rate and pulse volume was occasionally seen. Most of the patients had a tachycardia during the hypoglycemic state; a few developed a definite bradycardia. However, in no case was it necessary to terminate the treatment because of this. One of the female patients on several occasions developed such a feeble pulse that termination of the hypoglycemic state was necessary. In several of the patients it was noted that, with the enfeeblement of the pulse, the veins of the forearm which were commonly used for intravenous work, filled poorly during coma. In a few of these cases, it was necessary to terminate the hypoglycemia before a deep coma was obtained as the authors felt that it would be too much of a hazard to allow the patient to go into a deep coma and not have good veins available for intravenous work.

Ectopic systoles were occasionally noted. They usually appeared in the precomatose stage and on several occasions disappeared spontaneously but occasionally persisted long enough to require termination of the hypoglycemia. In all cases, the termination of the hypoglycemia was followed by a return of the rhythm to normal. In no case was any evidence of decompensation associated with the appearance of ectopic beats. A serious cardiovascular collapse was observed in only one case. This patient, a female 26 years of age, weighing 89 pounds, presented evidence of disordered

action of the endocrine system, especially adrenal insufficiency. Her treatment was reluctantly undertaken and the insulin administered carefully with close observation of the patient's physical condition. The patient had three deep comas with areflexia when the insulin dosage reached 60 units. On the ninth day of treatment, she went into a deep coma and showed evidence of cardiac embarrassment one-half hour after the onset of coma. The hypoglycemia was immediately terminated by administration of intravenous glucose. The heart action became increasingly more feeble following the termination of treatment and the patient failed to regain consciousness in the usual time. Restorative measures were instituted, adrenalin, caffeine, digalen, camphor-in-oil and coramin were administered with little immediate result. The patient became pulseless, respiration ceased and artificial respiration was administered. After four and one-half hours of intensive treatment, the patient's condition improved and consciousness was regained. Twenty-four hours later the patient had completely recovered from the cardiac collapse. For this reason this patient's treatment was not continued. Another female patient developed a definite auricular fibrillation on two occasions. This disappeared soon after termination of the hypoglycemic state; it was not accompanied by evidence of decompensation. No serious after effects were noted.

Results

Of the 75 cases treated, in 56 the treatment has been completed and in the remaining 19 the treatment is continued. The results of the 56 cases whose treatment has been completed are shown in Table 1:

TABLE 1

Sex	Recovered	Much improved	Improved	Unimproved	Total
Male	1	11	8	9	29
Female	1	10	1	15	27
Total	2	21	9	24	56

Of the 56 completed cases 32 (57 per cent) have shown a definite benefit. Of these 32 patients 24 (42.8 per cent of the completed cases) are on parole. Of these 24 patients one has been on parole 7 months, three for 6 months and the rest between 5 months and several days. Included in this group is one patient who was pre-

viously paroled but had to be returned to the hospital. Treatment was resumed and he improved sufficiently to be paroled again.

Not included in this group are five patients who were once paroled but who relapsed. They stayed out between three months and seven days. In four of these patients treatment was resumed. Three improved again but not sufficiently to allow parole.

Table 2 illustrates the response to the treatment according to diagnosis.

TABLE 2

Diagnosis	Recovered	Much improved	Improved	Unimproved	Total
Dementia præcox, paranoid	1	13	6	13	33
Dementia præcox, hebephrenic	0	2	3	4	9
Dementia præcox, catatonic	1	5	1	7	14
Total	2	20	10	24	56

The duration of the psychosis in the patients who responded favorably to the treatment varied between six months and 12 years. The average duration was over three years.

The duration of the psychosis of the patients who did not respond to the treatment varied between four months and 10 years. The average duration was three and one-half years.

It is interesting to note that in some of the cases, the results of this treatment surpassed our expectations. We treated a case of dementia præcox, paranoid type, of nine years duration whose prognosis was absolutely hopeless. This patient was extremely delusional and hallucinated. His treatment was started because no other patients with permits were available. Several weeks after his treatment was started, the patient began to improve gradually and finally was paroled from the hospital. He immediately adjusted well, at present he is a refrigerator salesman and has made an excellent adjustment. He has been out of the hospital six months. Another patient who has been sick for five and one-half years and whose prognosis was considered hopeless improved to the extent that she was paroled from the hospital. She has been out six months and is at present working as a stenographer. A third patient had been entirely inaccessible for a whole year. Ten days after this treatment was started, he became accessible, improved gradually but steadily and was paroled four months ago as

recovered. On the other hand, this treatment did not live up to our expectations. We had a woman of 28 years whose psychosis was of four months duration and the prognosis was regarded by everybody as fair. In spite of the fact that she had 54 treatments with 31 deep comas with areflexia and three convulsions, the patient remained unimproved. In two other female patients whose psychoses were of more than a year and one-half duration the prognosis was considered fair. They had a productive psychosis and received sufficient treatment. One had 58 deep comas with areflexia and the other 26 but neither of them showed any improvement. The last three cases were of the dementia præcox, paranoid type, which is supposedly more amenable to treatment. From our short experience we could say that at present we have no definite criteria of prognosis.

Summary and Conclusions

1. Seventy-five patients have been treated with hypoglycemia at the Central Islip State Hospital. The treatment in 56 of these patients has been completed and the remainder are yet under treatment.

2. A marked variation in the amount of insulin required to produce comas was observed. One case obtained a deep coma after receiving five units of insulin; another did not go into coma with 400 units.

3. The various complications observed during the treatment have been discussed. The authors feel that the most serious complication to hypoglycemic treatment is respiratory in nature; the danger from aspiration cannot be minimized. Two cases of pneumonia following aspiration were reported; one of these cases had a fatal termination. One serious cardiac complication was observed in a patient already thus predisposed. Temporary facial and peripheral paralysis, aphasias and one anaphylactic reaction were observed, with no serious results.

4. Injuries to the tongue and lips were observed with no serious results. The authors feel that with close observation of the patients, the danger to life from this treatment is much less than

is generally believed by the members of the profession not closely associated with the treatment.

5. A substantial gain in weight was observed in all patients undergoing this treatment, regardless of the degree of mental improvement shown.

6. Because of the lack of good material the results of treatment have not been as satisfactory as results reported by Dr. Sakel. Of the 56 completed cases, 32 (57 per cent) have shown a definite benefit by this type of treatment. Of these 32 patients, 24 (42.8 per cent of the completed cases) have improved sufficiently so that they have been allowed to leave the hospital and are now on parole. Five other cases not included in the improved group in this report were at one time sufficiently improved to allow parole but since that time have shown a recurrence of symptoms and have returned to the hospital.

As the treatment has been in use for such a short period of time and such a limited number of patients has been observed, no definite conclusions as to the ultimate value of the treatment can be made by the authors. They feel that it will require several years of observation of treated cases and a careful correlation of results from many hospitals before a definite evaluation of hypoglycemic treatment can be made. However, they feel that a definite step forward has been made in psychiatry by application of this treatment, as this is the first time that a schizophrenic psychosis could be actively influenced in a short time and that the improvement is of much greater duration than in any previous type of therapy of dementia præcox cases. The writers feel that this treatment should be continued.

Part II

Psychological Implications

BY MARCUS SCHATNER, M. D.

The literature concerning the psychological implications and approach toward the patient treated with hypoglycemia is limited. The physician using this type of treatment is so greatly impressed by the physiological changes that he is likely to lose sight of the fact that insulin alone would not produce the beneficial results in the patient. The writer does not minimize the sedative effect and the rapid and deep physiological changes caused by the injection of insulin, which are very impressive. The stimulation of the parasympathetic by injection of insulin and the attempts of the sympathetic to reestablish a balance in the autonomic nervous system are profound and produce rapid physiological changes. Likewise, the action of insulin upon the central nervous system, which ultimately produces a deep narcosis in the patient, is so kaleidoscopic and impressive that one is likely to attribute the improvement in the patient to these short-lived organic changes. That insulin is not as specific as quinine or salvarsan is beyond any doubt. Dr. Sakel claimed no such specificity nor did he maintain that the organic changes alone produced by insulin cause remission in the patient; he uses a definite psychological approach without defining it.

A number of physicians who treat dementia præcox patients with hypoglycemia disclaim the use of any psychological treatment and are convinced that the results obtained are solely due to the insulin. The records of our observations question the validity of their conclusion.

In this paper, the writer does not intend to discuss in general the recovery or improvement in dementia præcox but will limit the discussion to three questions which seem to be of great importance.

1. Is treatment by hypoglycemia an organic treatment, psychological or both?
2. What is the mechanism of the remission, and
3. May we speak of a cure?

To understand the psychological approach inherent in this method and how the latter produces psychological changes in the

patient, one has only to take into consideration the physician's procedure while examining the patient prior to treatment, his approach while the patient is in hypoglycemia and after the same patient is taken out of the hypoglycemic state. The patient is examined before the treatment is started and the physician becomes acquainted with him. He introduces himself, shakes hands with the patient, is extremely friendly and reassuring toward him, trying to gain his confidence. The physician does not go into the details of the patient's psychosis but tries to learn whether his psychosis is a productive one, his attitude toward it, whether he is pleased with his delusions and hallucinations or if these symptoms are annoying. At the close of the interview, the patient is told that he will be treated, assured that he will get well and be sent home. This method of approach has considerable effect even upon patients who are confused, inaccessible and seemingly out of contact with their surroundings.

To illustrate this, I cite two patients:

> A young man of 20 years, of the dementia præcox, catatonic type, had been confused, restless, impulsive and inaccessible for a whole year. After his recovery from the catatonic state, he claimed a great deal of amnesia for his behavior and the events of his psychosis. However, he spontaneously stated that he remembered the writer's first talk with him and the order to transfer him to the insulin ward for treatment. Further, he remembered the first injection and the writer's instructions to the nurse on the method of deep intramuscular injections of insulin.
>
> The second patient, a female of 24 years, had been in a catatonic state for at least six months, was mute, inaccessible, resistive, antagonistic and kept her eyes closed most of the time. After her recovery she gave the following account " . . . then one morning one of the nurses came up and said to hurry up and put a bathrobe on and come along with four or five of the other patients for treatment. I didn't know what was going to happen but I was very much interested. Everything seemed so new to me, walking through the office on the first floor, greeting the nurses and being put to bed in the dormitory . . . The injection hurt but it puzzled me."

We see that, at least in some of the patients, something of great psychological significance occurs even before the injection of insulin.

The patient is taken to the insulin ward, is put to bed and is in-

jected with insulin. The blinds are pulled down, the room is darkened, patient's eyes are covered and he is told to rest. This in itself has a very quieting effect on the patient. The writer observd many patients who were extremely disturbed and who had to be brought dressed in a camisole from the disturbed floor to the insulin ward. After the camisole was removed and they were told that they would be treated and get well, most of these patients became quiet and immediately dozed off before the injection was given. In the course of time the patient gradually goes into a deep coma, comparable to a profound narcosis. At first the most recently acquired phylogenetic and ontogenetic functions are lost and finally all higher centers of function are eliminated except the vegetative centers, which also are disturbed during hypoglycemia.

While the patient is under hypoglycemic treatment, extreme care is taken not to damage the patient nor to elicit antagonism. Everyone is instructed to be extremely polite to him. In fact the patient is handled like a delicate baby. He is pampered and as far as possible his whims are granted. Quite frequently this assumes the proportion of bribing the patient. For instance, if he demands something, the physician will grant the request and, as the occasion arises, will require something in return, such as good behavior, in eating his meals, in keeping himself clean, in dressing himself, in walking about the ward and in reading a newspaper. The patient is aware of this, frequently taking advantage of it and occasionally a situation develops where the patient does many things for the physician, demanding something in return.

In the first few days of the treatment some of the patients may become extremely hungry. If the patient asks for something to eat, after he has been in hypoglycemia a certain time, it is usually granted. The physician has to be extremely cautious not to lose the confidence of the patient. In his course, Dr. Sakel talked about a "confidence crisis" indicating that if a patient loses confidence, he may never get well mentally. Similarly, when the patient becomes excited due to hunger and creates a "hunger riot," Dr. Sakel advises the immediate administration of food, otherwise this patient may never show any mental improvement. When a patient occasionally refuses to come to the ward for the insulin injection,

he is allowed to have a rest that day. If a patient asks for something from the physician, such as a newspaper, magazine, chocolate or candy and the latter promises to bring this to him the next day, he must fulfill his promise, otherwise a "confidence crisis" may result. During the course of treatment, it occassionally happens that the patient improves and becomes extremely insistent about going home. On such occasions when the patient is really improved, his demand is granted and he is sent home, although he may not have had much treatment. Otherwise, the patient may relapse into his previous state. We see quite often that improvement of the patient depends neither upon the amount of insulin, the number of deep comas nor convulsions alone but in addition upon psychological factors. The writer had the opportunity of observing several patients who improved before they were in the second phase of the treatment, that is, before they had a coma. They showed a certain amount of improvement and, although later they had comas, the improvement did not continue. Another patient improved after the second injection. The first injection consisted of 15 units of insulin and on that day the patient would not talk to the writer. He was suspicious, disagreeable and, because of his disturbed behavior, he was kept on a disturbed floor. He refused to answer questions and when the writer approached him, buried his head in a pillow. However, on the second day, an hour after he received 25 units of insulin, he became pleasant, agreeable, asked the writer to place him on a quiet floor and allow him to go to the library. Since the patient promised good behavior, this was granted and from the second day of his treatment, patient gave up his delusions, became pleasant, agreeable and took good care of himself. The treatment was continued and the patient put into deep coma but the writer was convinced that he could have been sent home after the second injection of insulin.

When a stuporous patient responds only slightly or not at all to insulin, Dr. Sakel advises physical and psychic stimulation. The patient is poked in his ribs or abdomen and challenged to defend himself. The blankets are stripped off his bed and he is ordered to sit up or get out of bed and go to the diningroom to eat. When the patient is slow, he is encouraged to be faster. However, this

is done in a good-natured fashion, so that the patient gets the impression that the physician has only the patient's welfare at heart. The patient should neither be undertreated nor overtreated, as both may cause a relapse. His treatment should be stopped "at the right psychological moment," which depends entirely upon the judgment of the physician. When this moment is reached, Dr. Sakel advises, in some of the cases, to discharge the patient without putting him into the fourth or polarization phase. In his monograph (Neue Behandlung der Schizophrenie; Vienna, 1935) Dr. Sakel, on page 107, talks about hysterical reactions occurring in some of the patients at the beginning of the reconvalescence. "Reactions, which in one case for a short period of time, presented the picture of a hysterical psychosis. One psychotherapeutic session was necessary to eliminate this condition which lasted several hours. In several other patients, I succeeded in eliminating this condition in one short hypnotic session."

From the above we see clearly that a definite psychological approach is used toward these patients. When we treat patients who are sick with syphilis, diphtheria or malaria, we never use such approach because no psychology could influence these diseases. We inject salvarsan, antitoxin, or prescribe quinine and this alone brings about the recovery of the patient. If insulin were as specific, we would inject a certain amount of it and wait for the recovery to take place after a certain period of time had elapsed. In dementia præcox patients treated with hypoglycemia the remission does not depend upon the total amount of insulin injected, neither on the number of comas nor convulsions but rather on a combination of factors in which the psychological ones play the dominant part.

Those physicians who disclaim the use of any psychological treatment merely ignore the relationships involved. It cannot be too strongly emphasized that every event during the treatment, including the injection of insulin and anything the physician does, says or omits, has a psychological significance and influence on the patient.

The second point under consideration is the mechanism of the remission. To understand this mechanism, one has to take into

consideration the following: By putting a patient into the hypoglycemic state, he is made helpless and extremely dependent upon the physician. He knows that the physician and the nurses are watching him constantly and would not allow any mishaps. When he is hungry, the physician orders the nurse to give him food. When he complains of headaches, he gets some medicine. He sees and feels that the physician and nurses watch over him as over a baby. The writer is convinced that during the hypoglycemic treatment, an emotional relationship, which is essentially a transference, develops between most of the patients and the physicians. The physician may not be aware of it but the patient surely feels it. This transference develops frequently even in patients who prior to treatment were extremely disagreeable and refused to talk to the physician or to shake hands with him. To illustrate the transference, the writer mentions several points of behavior frequently observed in these patients. When the physician approaches the patient and shakes hands with him, it frequently happens that the patient will hold the hand of the physician with both his hands for a long time. When the physician puts his hand on the patient's forehead or strokes his hair, the latter will frequently put his hands over the hand of the physician and try to prolong this situation. Such expressions as, "Doctor, I have a whole world of confidence in you . . . I believe in you . . . You are my only doctor . . . You are a very kind doctor . . . I will do anything you say . . . You saved my life . . . If you say so, I believe you . . . You are very kind and good to me . . . If you are here I always feel well . . . I never saw a doctor who was so conscientious," are a daily occurrence. On numerous occasions, while the patient is in hypoglycemia or after he is taken out and awakes, he will grab the physician's hand and kiss it or demand to be kissed. Many more instances could be cited. In some cases, this transference becomes a deterrent to the complete recovery of the patient but in most of the cases the transference alone is responsible for the improvement. However, the transference is not handled in the same manner as transferences during psychoanalytic treatment, in which, as the patient develops a transference with resultant behavior, the duty of the analyst is to enlighten the patient regarding this behavior and

the meaning of it. In this way the transference is solved. In a dementia præcox patient treated with insulin, the physician does something diametrically opposite. He deliberately prolongs and deeps the transference in order to influence, suggest, persuade, encourage or reassure the patient to insure his improvement. If a patient complains of delusions of persecution or auditory hallucinations or makes some somatic complaints, the physician advises the patient that he was imagining things, that he was sick, that he had "brain fever" or that he had a bad dream. For instance, when the patient complains of his brother or father who supposedly persecute him, the physician will tell the patient that he knows his brother and father, that he talked to them and he is aware that they are fond of the patient, and that they are interested in his welfare. The physician will suggest that patient misinterpreted their intentions. Quite frequently, when the patient is bothered by hallucinations, the physican will tell him, "Forget about it, it is only imagination. You will overcome it. Nobody is talking about you, you had a bad dream. Sleep a little, rest and you will be all right," and so forth.

The injection of insulin makes the patient sick both physically and mentally. Food is taken away from the patient, his life is threatened and he becomes a helpless and dependent baby. The patient recollects that when he was a helpless child, his mother used to take care of him. She gave him food, watched over him and was solicitous that nothing wrong should happen to him. Further, he recollects that when he was disobedient, his mother punished him but at the same time she was good to him and took good care of him. He received love and security from her but he had to obey and give something to his mother in return, such as good behavior, obedience, cleanliness, et cetera. A similar situation is created during the hypoglycemic treatment. The patient is mentally sick, his behavior is irrational; this "displeases" the physician and, therefore, the patient is treated with injections of insulin which make him quite sick. In this extremely miserable condition he seeks help from anyone who can give it. Who can give help to a sick person, if not the physician who is constantly on the ward, near the patient and watches over him as over a sick child? He is

again in need of a solicitous, tender, loving mother. The physician, whether he realizes it or not, is at present the person who assumes that attitude toward the patient which patient's mother did when he was a helpless child. The patient in his present condition bestows the love which he once had for his mother, upon the physician. This is nothing else but a mother transference. The insulin shock treatment, therefore, serves to bring about such a transference.

> A female catatonic patient of 33 years, who has been mute, extremely negativistic, resistive and inaccessible for at least three years, became extremely hungry on the third day of her treatment. She demanded something to eat and the writer gave her a sugar solution to drink and stroked her hair, encouraged and told her that she was improving. The patient looked bewildered and confused and asked the writer whether he was her grandmother. The anamnesis and later the interview, proved that patient lost her mother at the age of two years and that she was brought up by her grandmother and lived with her until she reached the age of 18 years.

When the mother transference is established, most of the patients become accessible to suggestion, persuasion and encouragement and the physician makes use of this emotional state. The patient in return demands from the physician things which he used to demand from his mother and he quite frequently expresses this in different ways. He continues to behave like a child and, when he does not get what he wants from the physician or when the physician does something which displeases the patient, he relapses. This is one of the reasons for which we occasionally see patients who though one day are much improved, relapse the next day. Likewise, we see patients who are much improved for quite a period of time and who, for no apparent reason, relapse. In quite a few of the patients it was observed that on the day they went on parole, they became somewhat depressed; this only expressed their emotional state when confronted with the fact of parting from the physician, to whom they had made a transference.

Hypoglycemia plus this type of psychotherapy produces real improvement in many patients, which is readily understandable. However, the writer is of the opinion that this type of treatment cannot eliminate a patient's basic difficulties or produce a cure.

The patient improves or recovers from his schizophrenic attack just as a manic-depressive improves or recovers from his manic attack. In both instances, however, the basic difficulties, organic or psychological, remain unchanged. This remission is comparable to a spontaneous remission. However, with hypoglycemia, the remission is achieved by active therapy in a short period of time. The disease process is not eliminated but the patient, with the aid of the physician, suppresses his psychotic trend. Some of the patients actually make a conscious effort to achieve the suppression. Others conceal their trend by dissimulation and it becomes a private matter which ceases to interfere with their environment. This is also one of the conscious methods of adjustment. It is not even necessary for the physician to suggest to the patient, as the patient himself knows what the physician expects of him. He knows that the physician does not like his trend and behavior. Therefore, to please him, the patient who formed a transference toward the physician will either suddenly or gradually give up his trend and start to behave in a fashion which he thinks may please the physician. This may account for Dr. Sakel's advice not to go deeply into the patient's psychosis, not to stir it up nor remind him about his previous psychotic behavior. Only when the patient himself spontaneously brings the material to the physician, will he listen but never enter deeply into the mechanisms nor point out to the patient the cause of his psychotic behavior. Dr. Sakel compares the psychosis to a sewer which should not be stirred up. The physician, therefore, rarely talks to the patient about his psychosis and does not encourage him to talk about it either. He tells him to forget about it and to bury it as deeply as possible. We see that after a patient receives this type of treatment he emerges with a remission which is comparable to several layers of veneer. The writer is of the opinion that the physician has only to scratch a little below the surface, that is, to discuss with the patient in detail his previous psychosis and behavior and the patient will have a relapse.

It is obvious that we cannot discuss the accomplishment of a cure, because following the patient's release from the hospital with a remission, he may return soon with his previous symptoms. Some of the patients are unable to return to their former environment as

it produces the same psychological difficulties. The duration of patient's remission will depend upon many environmental and psychic factors, on his ability to make some kind of adjustment to reality, upon the transference he made toward the physician, and upon the duration of the transference. Many præcox patients are incapable of making a transference; others frequently make only short-lived transferences or transferences which serve only their psychotic purposes. The physician will serve as a superego or ego-ideal for the patient, who will endeavor to please the physician by staying outside the hospital, engaging in some occupation and making a good adjustment just as normal people endeavor to please their parents, teachers and people whom they took as their ego-ideal and incorporated in their superego.

Our experience proved that this type of treatment is not a cure, as patients who were paroled with a remakable remission, returned to the hospital with the same symptoms and difficulties they had prior to treatment. In our series of cases, five patients came back with the same psychological difficulties which they had prior to the treatment. Two had been regarded as recovered, two as much improved and one improved. The two recovered patients had excellent psychiatric insight. They spontaneously and intelligently discussed their previous psychotic behavior and showed an excellent emotional response. To all purposes they appeared recovered and no trace of a schizoid personality could be seen in theim. However, one returned to the hospital after two months parole and the other after three months parole, with the same psychotic symptoms which they had prior to treatment.

Summary and Conclusions

1. This paper was not intended to be a general discussion of the recovery or improvement in dementia præcox. It was limited to the discussion of the remissions caused by insulin shock therapy.

2. Three questions of great importance were discussed:

(a) Is treatment by hypoglycemia an organic treatment, psychological or both?

(b) What is the mechanism of the remission and

(c) May we speak of a cure?

3. The psychological approach toward these patients was described and its significance discussed. The insulin shock therapy is psychological treatment, although it produces short-lived, organic changes.

4. The injection of insulin reduces the patient to a helpless baby which predisposes him to a mother transference.

5. After the transference is achieved, the physician makes use of it by influencing, suggesting, encouraging and reassuring the patient.

6. The disease process is not eliminated and the remission is achieved by suppression of the psychotic trend. The patient effects a mother transference to the physician with or without the latter's efforts.

7. In view of the above it is difficult to accept the opinion that insulin shock therapy brings about a cure. However, the results are very encouraging and are obtained by active therapy in a short time.

8. This form of therapy supersedes all previous methods used in the treatment of dementia præcox and is regarded at present as the method of choice.

Discussion

Dr. Bellinger: Commissioner Parsons, Ladies and Gentlemen: I was asked to speak for five minutes so I have not prepared a formal paper, but will make a few remarks relative to the insulin treatment here.

In October, 1936, with the assistance of Dr. Parsons, we were able to send Dr. Terrence, three nurses and a medical stenographer to Bellevue Hospital for a period of seven weeks, for the purpose of observing the treatment of dementia præcox with hypoglycemia. As the results obtained were encouraging, treatment at this hospital was first begun on January 19, 1937, with a small group of patients. I directed that for the first group we should take patients whose outlook was not very favorable. I was under the impression that a considerable number of these would not recover. However, several of the group showed remarkable improvement. About this time this treatment occupied much space in the daily papers and we began to be beseiged with requests from relatives and friends of the patients for this form of treatment. As time went on we gradually increased the size of the group. However, in June the demands became so numerous that

we took over the fourth floor in building 10, making some minor changes to enable us to accommodate 30 male and 30 female patients, a total of 60, which number we have had under treatment since June 20.

This treatment requires considerable time on the part of the physicians. Dr. Terrence is in charge of the group, assisted by three other physicians. We have six graduate nurses and six attendants during the day who devote their entire forenoon to the group. However, in the afternoon some of them frequently assist on the other wards of the building.

When we first began the treatment of these cases we allowed them considerable exercise. After they had improved sufficiently they were permitted to go home for weekends and at times members of the family were allowed to take them out in the afternoon. During the first few weeks we had some difficulty with patients who developed symptoms of cardiac failure, characterized by auricular fibrillations, extra systoles, et cetera, which necessitated the immediate termination of the shock state and rest periods of two or three days. The fact that these same patients could be again treated without apparent cardiac embarrassment led me to believe that something had occurred which had reduced the amount of glycogen in the heart muscle and that in all probability the patients had been subjected to too much exercise. We were desirous of having some extensive blood chemistry examinations made on these patients, but owing to the volume of work in our laboratory incidental to the large admission rate and rapid turn-over of patients here, I did not feel I could ask Dr. Derby to undertake to do this work. However, I was fortunate in being able to interest a group of research men connected with Kings County Hospital, who offered to make studies for us, which they did. We found that the blood sugar level at which the patients developed shock varied in individual cases. One of our patients invariably went into shock when the blood sugar fell below 70, while the lowest rate was 24. On an average, the patients developed shock when the blood sugar receded to a level slightly below 50.

In treating the patients we administer insulin about 7 a. m. and terminate shock between 11:30 and 12:30, following which patients have a bath and their noonday meal. The afternoon is taken up with the occupational therapy class, the instructor going to the ward, after which the patients are permitted a moderate amount of exercise, including short walks provided the weather is not too warm. The remainder of the time is spent with reading and games. The groups are kept intact and not permitted to return to their respective wards. No patients are allowed to visit their homes during the course of treatment. Care is taken to see to it that each patient

partakes of a sufficient amount of nourishment at the noon and evening meals. If they refuse to eat they are tube-fed.

We feel that it is highly essential to maintain the carbohydrate reserve in these cases and not to permit a patient to use up the amount of glycogen which is normally held in reserve; in other words, we believe that it is highly important for the patient to have recovered from the effects of the shock of one day before receiving insulin on the following morning. Since following this plan we have no longer been troubled with the signs of cardiac collapse which we heretofore encountered; likewise, we have not had any cases of prolonged shock such as has been described by other observers. I attribute the lack of cardiac symptoms in our patients and the failure by them to develop protracted shock, to the fact that their carbohydrate reserve has been maintained. As to the number of convulsions, we have had very few. We have not observed any relationship between blood sugar findings and convulsions. At no time have we felt that convulsions had any influence upon recovery. For a time we terminated our cases with glucose given intravenously or by mouth. More recently, however, we have not administered glucose by mouth but have used instead a mixture of 900 c.c. of water, 100 c.c. of molasses and 6 oz. of cane sugar, giving each patient 200 c.c. by mouth. With this mixture our results have been fully as satisfactory as with the glucose and the cost is not as great. We administer glucose intravenously to the cases which need to be terminated suddenly, and use for this a 33 1/3 per cent solution which we prepare at this hospital. In giving intravenous glucose we do not administer more than 15 to 25 c.c., for if the patient is in a convulsion, he or she will be aroused within two or three minutes sufficiently to drink fluids from a glass.

We very much prefer to have our patients absorb the carbohydrates through the alimentary tract. We have found that the administration of a considerable quantity of glucose solution intravenously is, in many instances, followed by mild chills, muscle pains and headache, which may be more or less protracted and which is due, no doubt, to cerebral dehydration. By administering only a small amount of glucose intravenously all of these symptoms are prevented. Some days we do not give any glucose intravenously to our group of 60 patients, on other days it becomes necessary to treat two or three cases in this manner.

As to untoward effects: Since July 1 only 15 convulsive seizures have occurred in 60 patients treated daily. Generally speaking, patients have all done well with the exception of three. Two of our cases developed what appeared to be pneumonia which necessitated stopping the treatment until such time as they recovered. The third case is that of a boy who is in bed

at the present time and has not received insulin for the past month. Prior to coming here he had had two or three attacks of pneumonia. One day about one and one-half hours after the termination of his shock and after his noonday meal, he suffered a chill following which he developed what was apparently lobar pneumonia involving the lower lobe of the left lung. He was given very active treatment, which included the administration of pneumonia antibodies and the giving of oxygen. About the time the lower left lobe started to resolve, the right side began to be involved and in a short time the whole right lung showed consolidation. He was very ill, later developed empyema on the left side which required drainage. At the present time he is not running a temperature and I believe he is out of danger. This, if in any way the result of hypoglycemic treatment, was the most serious untoward reaction we have had up to the present time. In this connection I might say we have had no cases which terminated fatally.

Treatment has been completed in 84 cases—49 male and 35 female. Thirty-two males and 24 females—a total of 56, or 66.6 per cent, have left the hospital on parole. Of the 13 men remaining in the hospital, 7 have shown improvement; 6 are regarded as unimproved. Eight of the 15 female patients still in the hospital have shown some improvement; 7 are apparently unimproved. Twenty of the 32 men on parole are regularly employed; one is earning $50 per week. Two young boys are planning to return to school. Several of the female patients are employed. We considered 20 male and 18 female patients as recovered. All of these patients we felt were free from psychotic symptoms and had excellent insight into their condition. The much improved group, of which there were 8 male and 4 female, were apparently free from their psychotic symptoms, but their insight was not completed. The six in the improved group, 4 male and 2 female—no longer suffered from delusions or hallucinations, but their insight remained defective.

The average duration of mental illness in those recorded as recovered was 13 months prior to admission, in the much improved group 16.7 months and in the improved group, 26 months. Of those remaining in the hospital and regarded as improved, the average duration of illness was 34 months; those unimproved after treatment, 45 months. Two patients were returned from parole and are now numbered among the 60 receiving treatment. One, a male catatonic, returned after a parole period of one month and 16 days; the other, a woman, who showed paranoid symptoms, returned two and one-half months after parole. In both cases the families were very anxious to have the patients paroled. In the case of the male patient, the father, who was somewhat alcoholic, entered into an altercation with the patient. The

home situation in this case is bad and we will not again parole him to the custody of his father. As to the female patient, she suffered a relapse, the cause of which we were unable to ascertain. Both patients are now under treatment and both are much better than at the time they returned to the hospital.

Several of our patients have been on parole since February and are doing well. Many of the patients remaining in the hospital were problem cases prior to treatment in that they were actively disturbed, violent and in some instances, mute and inaccessible. A large percentage of these cases have shown material improvement as to conduct and are no longer difficult to care for. The physical condition of all of the patients has improved during treatment.

As to the psychological approach, I am not sure that I have an explanation for what actually takes place in these cases. I see many of these patients apparently recover. I have observed cases of dementia præcox for more than a quarter of a century and have seen some improve and apparently recover, but good insight was not the rule. I have seen many cases of dementia præcox become seriously ill and require active medical and nursing care and attention. In some instances following their recovery there was a material improvement in their conduct in general but in each instance they were still cases of schizophrenia, indifferent, preoccupied, hallucinated and delusional. I am not satisfied that the psychoanalytic approach in these cases is the proper one. I have a feeling that some biochemical changes take place. Following treatment these patients look different, they gain in weight and their whole expression and makeup in many instances seems to be entirely different. We have had several cases in which a more or less persistent skin condition from which the patient suffered has cleared up entirely during treatment. I believe that there must be some change in metabolism in these cases which we do not fully understand. It may be that the general endocrine balance undergoes some changes as a result of this treatment. I cannot conceive that the giving of active nursing care and treatment and the so-called return to the infantile setting is sufficient to explain the change which comes over these patients.

As to the cost of treatment, I have heard very little about it. Naturally it makes a difference how many patients are under treatment: the greater the number the less the cost will be. Within the last two weeks I have gone into this matter with some care and I find that with our present unit of 60 patients it costs about $34.80 to treat a patient for a period of 50 days, over and above what it would cost to maintain him in the hospital without the insulin treatment. We found that buying the insulin as we do it costs on an

average of 19.6 cents per day per patient. These patients receive a greater food allowance, including an additional pint of milk a day and on warm days we have served them with lemonade in the afternoon, so that the extra food would cost about 4 cents per day. We require four graduate nurses and four attendants in addition to the regular quota to care for the group of 60 patients. Computing their salary and maintenance, this would amount to a net average of $22 for each patient during a 50-day period. I have also added $1 per patient to cover the cost of any special medication which might be required by the group during a 50-day period. This would make a total of $34.80, or an average of 69.6 cents per day over and above the regular maintenance rate.

Dr. ROSSMAN: I do not think I have very much to add to Dr. Bellinger's statement except to enlarge on his comments in regard to psychological aspects of the insulin treatment. It is true that patients receiving the Sakel treatment are given individual attenion but they are not pampered. As a matter of fact those patients who have coma doses are not very well able to profit psychologically by all the added attention. They are for several hours either in coma or in a stuporous state. After the treatment is over they are not handled any differently from other patients with the exception of watching for secondary reactions. When one has seen a patient in deep hypoglycemia, when the whole organism including the vital centers is so affected as to imperil the life of the patient, one hardly entertains the thought that the improvement in the mental picture is purely or chiefly psychological.

If, as Dr. Schatner states, remissions are due to the psychological effects of the treatment then it should be very important to question the patient thoroughly about his symptoms and to discuss his illness with him since the hypoglycemic state makes him more amenable to psychological factors. As a matter of fact Dr. Sakel never intended that all patients receiving his treatment be released from the hospital without a thorough investigation into their mental status. He merely warned against bringing to the surface material that would aggravate the mental condition of the patient who had not completely recovered from his illness or who had been ill so long as to make any deep probing dangerous. This is good psychiatric judgment. On the other hand those patients who seem to have recovered and who can be benefited by frequent psychotherapeutic talks should and do receive examinations to determine their mental condition and the degree of insight. The question as to whether the patient is completely recovered is no different in the Sakel treatment than in other methods. This can be answered only by following the patient's condition over a long period of time.

Dr. O'Neil in discussing complications did not mention one that we encountered. We have found that there are times when the patient does not respond to even intravenous glucose administrations but remains in coma for hours or even days. We have three cases who were in a comatose state for three days. For a long time following this they showed a typical organic mental picture of confusion, delirium; later, impairment in memory, disorientation and fatigability. The interesting and important feature of this "complication" is that after they have recovered from the physical effects they are entirely free from mental symptoms. One of these patients had had only eight treatments and he has now been home for about four months apparntly recovered after an illness of above five years duration. We believe that these cases show the importance of deep coma in nearly all of our chronic cases, a point which Dr. Sakel has emphasized so much. Obviously such a patient will be helped little or not at all by light coma.

Results of the hypoglycemic treatment reported in the usual way as recovered, much improved, etc., do not give very much information for comparing results. We have, therefore, tabulated our results in accordance with the duration of the psychosis. Because of the fact that there is often so much difficulty in deciding whether a patient is recovered or only much improved and since this is considered at the present time more of an academic point, we have grouped together those patients who are either apparently recovered or much improved; in other words those patients who are free from symptoms and are able to return to their place in society. In this way the effects of the hypoglycemic treatment can be learned and the figures also have some prognostic value. On the basis of 58 completed male cases we have found that patients were either recovered or much improved in 70 per cent of those with a duration of two years and under; 40 per cent with a duration of two to six years and 16 per cent with a duration of over six years. Sixteen per cent of all the cases treated showed no improvement.

Dr. GAULOCHER: I do not want to seem lacking in enthusiasm about the insulin therapy of dementia præcox, but the use of the term dementia præcox without qualification irks me. It leaves the impression that dementia præcox is a clinical entity, one case as much like another as cans of tomatoes on the A. and P. shelf. We also hear the expression "an early case of dementia præcox." I cannot see how a case can be dated unless one considers the fulminating symptoms as the onset of the disease—a view not generally held. Incidentally, these "acute cases" show a relatively good prognosis without special treatment. To go a step further I am of the opinion that two distinct schizophrenic groups should be recognized: one repre-

sents a reaction type of psychosis with præcox symptoms but good prognosis, while the other comprises the malignant cases going on to deterioration. Furthermore, it is often difficult to distinguish the relatively benign cases of schizophrenia from the malignant ones. Hence difficulty in evaluating results of treatment. Be that as it may, there can be no doubt about the effectiveness of insulin therapy in schizophrenia generally. In those cases regarded as having a good prognosis, untreated, the insulin therapy cuts short the duration—an extremely important point—in the economic and social aspects of mental disease.

I may mention in passing that we at Harlem Valley State Hospital have treated several cases of manic-depressive psychoses and several psychoneuroties. The results were very gratifying. One, a woman who had been in the manic phase for 16 months continuously recovered completely after 16 injections of insulin. Her mental improvement was accompanied by a marked gain in weight—an interesting observation frequently seen. I was impressed by the heightened degree of suggestibility of the neuroties as they came out of hypoglycemic coma.

As for the multitude of happenings observed in insulin therapy, careful records should be kept. Perhaps, there may be a significant correlation between the vegetative, neurological and psychological variations. I have made a chart facilitating the recording of observations by using the "check" method.

I do not agree with the statement that convulsions occurring during hypoglycemia have no appreciable effect therapeutically. In some of our patients, convulsions seem to have had a beneficial effect. A female patient, aged 42, was a striking example. Although her symptoms were predominately schizophrenic, there were also some manic-like symptoms. She has been psychotic for nine years. She was treated with insulin but after the tenth injection an alarming anaphylactic reaction occurred. Insulin from the pancreas of a different animal was tried but she again showed anaphylaxis. We then started the patient on "metrazol" and after the second convulsion a striking improvement took place. Her habits became clean, hostility and assaultiveness disappeared, and her speech previously a word-salad became coherent. Even the patient recognized the improvement in herself. Of course, the convulsions in this case were produced by "metrazol" but those produced by insulin may have the same effect.

We have treated 65 female cases of dementia præcox to date. Four of these cases were not typically præcox although most of their symptoms fell in that category. Of the 65, we have paroled 28. Of the 28, 5 have returned from parole. At the time of parole, we regarded 9 as apparently re-

covered; 18 as much improved and 1 improved. We still have 37 in the hospital; 10 are regarded as much improved, 11 improved and 16 unimproved. Of those 10, 4 will be able to leave the hospital in a very short time.

In conclusion, I feel that an open-minded, expectant attitude should be adopted in regard to insulin therapy rather than the assertion of dogmatic opinions as to whether improvement is brought about through psychological or physiological happenings.

Dr. NOLAN D. C. LEWIS: It has now been a year since we started the insulin treatment in this country but as yet we have very little information of a positive nature to discuss in addition to what we had in the beginning. We are collecting a great many facts and observations but the time period is not yet long enough for our facts to be condensed sufficiently in places so that we can be definite in expressing the ideas that they may convey. We are certain of one thing and that is that we have never seen any form of treatment which offered as much hope as the insulin therapy as applied to dementia præcox. A great many shifts and changes in the clinical picture are brought about and whether one endorses these changes as improvements or recoveries, or whatever name is applied, certainly there are interesting remissions many of which have the appearance of complete recovery. And these remissions are in excess of the usual 20 to 25 per cent of spontaneous recoveries which we have always had to take into consideration since the time it was pointed out by Kraepelin many years ago. We get 20 to 25 per cent spontaneous recoveries in the acute cases and therefore we must remember that when we are considering statistics on acute cases, we must deduct the figures for spontaneous recoveries at the time we announce the final percentage of remissions or recoveries from any line of treatment. Scientifically we are probably not justified in referring to these remissions as recoveries, although they may actually be so. I make this remark in view of the fact that we do not know as yet the cause of the disorder known as dementia præcox and therefore how are we to know that the individual has recovered from anything other than the surface expression of his symptoms. The individual appears to recover, returns to his work and some definite change occurs which allows him to at least compensate in some way for his handicaps, but we are certainly not able to determine whether or not the individual is still predisposed to the disorder and will break down again in the environment associated with his original difficulties.

In time we should be able to accrue some definite information regarding this point, as many individuals, following the insulin therapy, have been discharged into their usual, outside environments where the practical test

of readjustment takes place. Any relapses occurring under these conditions will be well worth studying in detail. Many so-called recovered patients may be able to get along for many months or years in an environment where their difficulties are taken into consideration and where they may be relieved from some of the stresses of life.

I agree with the previous speakers that dementia præcox is a heterogeneous group of disorders; that we are probably dealing with a large variety of processes, that the insulin approach may aid us in differentiating the types. As far as the effect of insulin goes and as to whether there is some definite physical reason for the remissions on the one hand or psychological effects on the other, we are unable to determine at the present state of our factual knowledge. At the present one should be able to take either side and defend it intelligently in an argument, inasmuch as we do not know the actual effect of insulin in these cases. For instance, what are the changes in the mineral salts of the body? What is the actual effect of insulin on the brain structure and function? How much do we know of the oxygenation, changes in the tissues and the possible changes in the endocrine system? In other words, we are largely unaware of what types of physical changes are actually taking place. From the standpoint of psychology, everything that has happened so far can be explained on the basis of psychological shock, suggestions, infantile mechanisms, death and rebirth, et cetera. In the meantime, various groups are studying and experimenting on all of these matters just mentioned so that we may have the hope of a more thorough understanding of the whole matter in the near future. I expect that within another year's time we shall have a more complete story to tell and to discuss. The insulin experiment as in other types of therapy where psychological conditions are involved, is rather complex, as not only the insulin itself but the physician, the psychological situation and the complexities of the patient, are all part of the experiment itself.

Dr. Richard H. Hutchings: I have been interested in what I have heard this morning but I have been impressed by the evident lack of information we have in regard to this remedy. We are treading a precarious way in the dark, lacking, as we do, a full understanding of our employment of insulin for psychiatric treatment. We have no satisfactory understanding of what happens within the patient's body when we administer this remedy in the doses recommended. I should like to urge that thorough study be given to the factors which may be investigated and those which may be observed and noted at the bedside. These observations should be made when the patients are undergoing treatment and follow-up work is needed for there have been reported relapses, the causes of which you are not agreed upon.

As to the question whether the influence exerted by insulin is physical or psychological, I will venture the opinion that both enter into it. Some of you have expressed the opinion that the effect of insulin in clearing away schizophrenic symptoms is purely physical and its action is on the brain cells. We have also heard that the influence is predominately psychological. One speaker remarked that a patient who had returned home relapsed because his father did not understand the proper management of the boy, creating difficulties for him. If that is a true explanation of the relapse and I have no reason to doubt it, the effect of insulin could not have been purely organic for an emotional situation has brought about a relapse. For my own part, I am satisfied that there are psychological elements in this treatment, but at the same time I do not deny the possibility of insulin affecting the metabolism of the body in some way that helps in the recovery of some but not of all.

It is evident that we have reached a point where special studies should be made which will throw light upon the recoveries and also upon the relapses. I have much hope that in each hospital where this treatment is going on, notes and laboratory tests will be made concerning the physiological changes which take place. Equally important will be social service investigations of the homes and of the situation which the patient was called upon to face when he returned there.

The discussion here today has clearly indicated that the next development will be along the line of studies of the patient's personality and environment as well as of chemistry and physiology which may throw some light upon what it is that effects a cure and what it is that maintains or destroys it when the patient is no longer in the hospital.

The PSYCHIATRIC QUARTERLY will welcome papers upon this general subject based, as they should be, upon well-studied cases.

Dr. OSWALD BOLTZ: In an informal discussion of the results of the insulin therapy with representatives of the various State hospitals, one gets quite a diversity of opinion, and to be sure at this early stage it is very difficult to formulate any definite view as to the ultimate value of Sakel's method. The important thing, as I see it, is that this therapy has diverted our attention from the therapeutic impotency of psychoanalytic theory and approach, as far as schizophrenia is concerned, and that it will make an important contribution toward helping us to look at the disorder from a more general, constitutional point of view in which the mental symptoms of schizophrenia are only a fraction of the disorder actually present. My criticism of the method is that it is not sufficiently individualistic; that it has a tendency to be a "rule of thumb" therapy. Better results could undoubt-

edly be obtained with a more individualized kind of treatment if one could be developed. It is my experience that, therapeutically at least, there are different varieties of schizophrenia other than the four types described in the textbooks and that such classification is probably too artificial. That might account for the different therapeutic reactions to insulin therapy. We have been taught to treat patients as a whole and individually. I do not think we always do that. I believe it most important that we endeavor to carry out this principle and not just talk about it.

Personally I am very sympathetic toward the Sakel method. I do believe, however, that it is only a beginning in the treatment of schizophrenia and, while it is undoubtedly a step in the right direction, other methods for treating this complex disorder even more effectively will be developed in the future.

Dr. JAMES O'DONNELL: On considering the treatment of schizophrenia with insulin, a question arises as to the efficacy of the psychologic approach. As first I was quite sold on this method. However, one must consider that in some hospitals patients who are receiving this treatment are kept together on a ward devoted to this treatment only and have individual nursing care; in other hospitals they do not have such but are returned each day, following treatment, to different wards where they mix with patients not receiving treatment, and very similar results are obtained. One wonders whether the psychological approach has anything to do with it or whether there is not some chemical process set up in the body that brings about the improvement. An article by Duncan Whitehead, M. D., in the last issue of the PSYCHIATRIC QUARTERLY points out that 50 per cent of the schizophrenics in this group, with duration of six months or under, were released without insulin treatment.

In looking over the records of schizophrenic patients discharged from Rockland State Hospital during the past fiscal year, I found the total number to be 233. The duration of illness before admission to the hospital of 186 was under two years. The greater number of those discharged were in the catatonic and paranoid groups.

It is in these same types that results are obtained with insulin. Equally as good results are now being claimed with camphor treatment. It therefore seems that some reaction is set up in the individual causing him to respond much more rapidly than under the usual forms of treatment. I think that before we can properly evaluate the efficacy of insulin treatment we should first determine the duration of illness prior to admission, the duration of illness in the hospital and the types and number of each discharged from State hospitals from year to year, then compare them with a

similar group of insulin-treated cases. We should not quibble about recovery but should compare those that are able to adjust outside of the hospital. At the present time, it seems to me that all we can say is that insulin speeds up the process of recovery.

The CHAIR: The papers are still before you. Dr. O'Neill, will you close the discussion?

Dr. FRANCIS J. O'NEILL: We received a wealth of information concerning the results which have been obtained by other hospitals. I am very glad to find there is so much discussion.

The CHAIR: Does Dr. Schatner care to speak?

Dr. MARCUS SCHATNER: I have not much to add to the things I spoke about in the paper but I want to point out one fact that Dr. Hutchings brought up, and that is, what causes the patient to relapse.

We had a female patient, who made a remarkable recovery and we sent her home. She came back with the identical symptoms which brought her to the hospital the first time. Her father has been in a State hospital 14 years; her two grandfathers were also insane. The mother lives on Long Island and has a boarder who is an old man. The symptoms which brought the patient to the hospital on her first admission were these: At night she went to this man's room and demanded cigarettes and a light. He gave them to her, and then she accused the man of assaulting her. When she went on parole the man was still living there as a boarder. After six weeks parole she was returned to the hospital because of recurrence of the same symptoms. At 2 o'clock in the morning she went to the boarder's room and demanded cigarettes and then accused him of assaulting her. This illustrates, as I pointed out in the paper, that some patients cannot go back to the previous environment, as the same environment causes the same psychological difficulty.

Th CHAIR: Dr. Bellinger, have you any comments to make?

Dr. CLARENCE H. BELLINGER: I have very little to say in closing. I cannot help but feel that the treatment of dementia præcox with insulin is decidedly worthwhile. I think it is a step in the right direction and that we are obtaining very encouraging results with it.

A STUDY OF THE IMPAIRMENT OF "ABSTRACT BEHAVIOR" IN SCHIZOPHRENIC PATIENTS

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The symptoms found in patients with organic brain lesions are often considered as isolated disturbances in performances. Goldstein and Gelb[4] have shown that many of these varied phenomena can be brought together as the expression of one general functional change produced by the pathological condition. The symptoms can best be understood as the result of a change in the whole behavior of the individual rather than a defect in isolated "capacities." The change in the patients observed was characterized by the authors as an impairment of the capacity for "abstract behavior." The patients tend to react in a more "concrete" manner. From this viewpoint, the normal adult is capable of responding either in an abstract or a concrete way.

> In the abstract attitude we are not directed toward an individual object but toward a category of which that object represents itself only as an accidental example and representative of that category. In the concrete attitude the action is directly determined by momentary sense impressions. This concrete attitude is more realistic. We are directed rather toward the concrete thing in its particular uniqueness. (p. 304[3].)

The patients with organic lesions are more concrete because of the impairment of their abstract behavior. The words "abstract" and "concrete" are used in the sense defined above and refer to characteristic and definite attitudes and behavior.

Goldstein and Gelb came to these conclusions by methods of investigation which are especially adaptable for studying the changes of the total personality, or the attitudes corresponding to these changes. These investigations were carried out mainly by the use of various sorting tests. Recently the results of these tests were confirmed by Goldstein through their application to more cases of organic brain disease. At the same time he supplemented the

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earlier methods by the addition of other tests, i. e., Kohs Block Test, Feature-Profile Performance Test, the Stanford Revision of the Binet Test, etc. The latter tests were adjusted for the purpose of investigating the subject's attitude in performance and proved to be also very useful in demonstrating the characteristic changes in the patients.

Inasmuch as the methods employed with such organic cases have been productive in the study of personality changes, it was thought profitable to apply the same procedures to schizophrenic patients. This application has been suggested by the Russian psychiatrist, Vigotsky.[9] Following the line of investigation of Goldstein and Gelb, Vigotsky used a different type of sorting test and concluded that the mental change in schizophrenia was very similar to that found by Goldstein and Gelb in cases of organic brain disease. These results were also confirmed by the investigations of Hanfmann and Kasanin[6] during the past year.

The tests used by Goldstein and Gelb differ from the Vigotsky test in being simpler and more adaptable to various situations. For this reason they were employed in the present study. The great advantage in using these tests was that they had been used by Goldstein and Gelb for many years on a large number of patients, so that there was good insight into the structure of the tests and the various methods by which the tasks presented could be carried out by the patients. Such knowledge is extremely essential in understanding the patient's performances; without this information there is the danger of misinterpreting the way in which the subject carried out the test and of being deceived by the patient's apparently successful performance.[2]

I. Description of the Tests

A. *Color Sorting Test*

The woolen skeins of the Holmgren test for color efficiency were placed before the subject in a random heap and the following procedures were carried out.

1. The subject was asked to select all the red skeins and put them together, i. e., all the various shades of red.

2. The examiner picked out one skein, for example, a dark red, and the subject was asked to choose skeins of the same or of similar color, selecting all which seemed to him to belong together.

Goldstein and Gelb have pointed out that there are two different approaches to this problem in normal adults.[5] A normal person with good color efficiency usually selects a great number of different shades of the same basic quality. For example, different reds are selected without regard to the intensity, purity, brightness, etc., of the single shade. The subject's attention is directed to the basic color quality, and he chooses all the skeins which he recognizes as belonging to the given basic color quality, even though he sees that these skeins differ in certain other attributes.

> We do so because we mean that they belong together in respect to the basic quality. The several shades are to us only examples of this quality. We treat the skeins not as things as they are given, but as representatives of the basic quality. For the moment we ignore all but the specific character requested. We inhibit or disregard all other attributes which may enter attentive consciousness. We are able to do this since we can abstract and hold fast the direction of procedure once initiated.
>
> There is another approach, however, open to the normal person. When we start with one particular skein and pass it over the heap, passively surrendering ourselves to the impressions emerging as we do so, then one or two things will take place: if skeins resembling our sample in all attributes are present, all these immediately cohere in a unitary sensory experience. If, however, they do not match our sample in all respects, but only in some, we shall experience between the two kinds of approach, namely, in the first, a definite ordering principle determines our action; in the other, there is no such principle and our action is passively determined by the outer impressions. (p. 304.[3])

Goldstein and Gelb point out that these two kinds of behavior are an expression of man's twofold attitude to the world in general, the abstract and concrete attitude, as has been mentioned before. The normal adult is capable of either type of behavior or attitude. It depends upon his personality and the particular situation whether he tends toward one or the other. However, if he ordinarily might have a tendency to take the concrete attitude, he

is capable of taking the other attitude, when the situation necessitates such an attitude. He is able to shift from one type of attitude to the other voluntarily. As Goldstein has explained, voluntary shifting presupposes the capacity for the abstract attitude.[2]

B. *Color-form Sorting Test*

In this test, cardboard figures that varied in form and color were placed before the subject and he was asked to put together those that belonged together. The materials were modeled after those used by Weigl[10] in his study of cases of cerebral lesions. There were 12 cardboard figures of three different forms; squares, triangles, and circles. Each of these forms appeared in four colors, red, yellow, blue and green. They could thus be sorted either on the basis of form or color. The subject was told to put together those that belonged together. After one sorting had been carried out, the subject was then asked to do it in another or a different way in order to determine whether he was able to shift his attitude from one aspect to another in the situation.

Weigl found that normal adults were able to sort either on the basis of form or color with little difference in difficulty, and were able to state the basis of these sortings. After sorting them in one way they were able to shift their attention from one attribute to another and to sort the figure in a different way, when asked to do so.

C. *Object Sorting Test*

A modification of the object sorting test used by Weigl with organic cases was administered. A group of miscellaneous objects was placed before the subject. He was asked to look over the objects to be sure he recognized what they were. He was then asked to select one object and after this was carried out he was then told to place with the object "all that belonged with it." The materials were chosen so that many different types of classification were possible. The group consisted of a bicycle bell, a lock with keys attached, smoking materials, toy smoking materials, eating utensils, a toy hammer, large screw-driver and pliers, toy screw-driver and pliers, a red circle, a yellow circle, two lumps of sugar, two corks, two nails, two matches, a matchbox, a nail embedded in

wood, and a rubber ball. They could be classified as to color, form, use, double occurrence, and material. After one series was completed according to the subject's report, another object was selected by the examiner and the same instructions given as before. After a number of such series were made, the objects of a particular category were grouped by the examiner and the subject was asked to state whether or not these objects belonged together. If he responded that they did belong together, he was asked why.

Weigl[10] reported from observation of performance on this test that normal adults behaved in two ways. One type of behavior was the isolation of pairs of objects into very concrete groups. The other type of reaction produced large groups indicative of a categorical *Einstellung* on the part of the subject. Normal adults showed greater lability of attitude than the organic cases when asked to arrange the objects in a different way than they had been arranged previously. The patients with organic lesions concentrated more on the practical use of the objects and arranged them on the basis of common use in a concrete situation rather than on the basis of broader categories. Further, they had the greatest difficulty in shifting from one type of grouping to another. (Cf. E. Rothmann, p. 16[8].)

D. *Kohs Block Test* (with the modification made by Goldstein*)

The Kohs Block Test is a performance test in which the subject is given a design and is asked to reproduce it with a specified number of blocks (four or more). The test was designed by Kohs to determine mental age level on the basis of number of errors and total time. The standardized procedure was varied to suit the needs of the present problem.

Observation of the way in which normal adults proceed indicated that either of two different approaches to solution may be taken. The subject may be intent upon reproducing the "figure" that is present in the design or may pay little attention to the figure and proceed by dividing the design into parts, as it is composed by blocks, and placing them block by block to form the design. The normal adult may be first impressed by the figure and may start with an attempt to reproduce the figure. However, he will very

*To be published in detail at a later date.

soon recognize that it is impossible to solve the problem in this way, and will then proceed by the dividing method. Only then can he succeed. [However, this procedure demands an abstract attitude and organic patients are not able to do so because of the impairment of their abstract attitude.] For demonstrating the relationship of this deficiency and their failure in performance the test was modified in a way which was based upon experiences with organic patients. These observations showed that the difficulty in performance arises mainly from the following factors:

1. Difference in size. The figure in the original design is much smaller than the blocks by which it is to be built up (one-fourth the size). Therefore, when the patient was unable to proceed with the original design, a design was presented which corresponded in size to the design made up of blocks.

2. Incapacity to make the divisions by himself which are necessary for solving the figure. Therefore, the figure was divided by lines and either the smaller or the larger design was used.

3. Sometimes this division in the design did not bring a success. In such cases the patient was not confronted with the design but with a model made up of blocks.

The observation of organic patients showed that the problem involves varying grades of difficulty which arise from the different grades of abstraction necessary to perform the individual task. These different tasks suggest a scale for testing the extent of the impairment of the abstract capacity of a patient. This is shown by the fact that all organic patients who were able to perform successfully under the first types of presentation of the figures were always successful on the latter types. No subjects failing some of the later stages were successful under the earlier forms of presentation. The presentation of the test to our schizophrenic patients was as follows:

[First, the standard card design from Kohs blocks was presented. If the subject was not able to solve the problem, the card was removed and the blocks reshuffled. The same design was again presented but the size of the design corresponded exactly to that of the correct block reproduction, whereas previously it was one-fourth the size of the block model. If the subject was still unsuc-

cessful, the third presentation consisted of the design "broken down" into units by black lines which delineated the boundaries of each block. The fourth stage consisted in demonstration by the experimenter of the correct solution, pointing out how the black lines might be used to determine the placement. This demonstration was immediately followed by the subject's attempt to reproduce the design. The final stage consisted in giving the subject a block model and asking him to reproduce this. In this task there is no discrepancy in any attributes between the model and the subject's blocks. By presenting these stages one after another it was possible to determine the particular elements in the situation responsible for the subject's failure.

E. *Feature Profile Test*

This test is part of the Pintner-Paterson Performance Scale,[7] but the presentation in this investigation was adjusted to the present problem. In the standard procedure it is scored only on the basis of time. In the present procedure all errors were recorded and the amount of assistance varied according to the subject's performance. By analyzing the moves made by the subject and the point at which success occurred in each case it was possible to evaluate the elements producing the subject's failure.

The test consists in putting parts together to form the picture of a man's head. In order to assemble it correctly, it is necessary to pay attention to both the shape of the parts and to the lines which form the details of the picture appearing on them. Thus, in placing the four pieces together to form the ear, as is required for a correct solution, the subject must be able to work in terms of two aspects of the situation or to shift voluntarily back and forth from one to the other. This demands a shifting of attitude, a capacity which, as mentioned before, is lost if the abstract attitude is impaired. According to the norms given for this test,[7] a child with the mental age of 10 years is able to complete it successfully in five minutes without help.

II. Subjects

The subjects tested in the investigation were all hospitalized cases of schizophrenia at the New York Psychiatric Institute and

Rockland State Hospital. Of the 16 cases studied, 11 were diagnosed hebephrenic type, three paranoid type, and two catatonic type. All but the three paranoid patients were considered by the psychiatrists in charge to show evidence of "deterioration." The duration of hospitalization varied from six months to 20 years. All subjects were between 20 and 40 years of age. These patients were tested individually on at least two and in some cases four different occasions. The average amount of time spent with each patient was between three and four hours. All patients were of average intelligence on the basis of educational and vocational achievements. They all had normal color vision according to the Ishihara Test for color blindness.

III. Results

The protocols of the examination of a single case will first be considered along with some explanation of these observations.

Case A: Patient was a man 36 years of age, who had been hospitalized for two years. He graduated from high school without difficulty and was very successful in the management of a chain of stores. Although he was too disturbed to obtain a valid rating of intelligence on the Stanford-Binet, he was considered of at least average intelligence. Neurological examination was negative. Patient had auditory and visual hallucinations and showed fairly well systematized delusions. The diagnosis was paranoid dementia præcox.

A. *Color Sorting Test*

When asked to select all the red skeins and place them together the patient selected three skeins of a bright, well-saturated red and then stopped as if the task were completed. When asked if these were the only red ones, the patient said "Yes." A lighter red was then selected by the experimenter with the question as to whether it could not also be included. The patient said, "Yes, if you were knitting and needed another color." When urged again to select all that belonged with the skeins already chosen, the patient held one of the skeins of the heap of colors and finally selected a skein that was closely similar in shade but slightly lighter. He then placed the first skein on the table and held the second skein over

the heap, selecting a skein that resembled this one closely. By this method the patient selected five more skeins of lighter and lighter tint. When asked if they all belonged together the patient denied it. To the question "Couldn't they all be called red?" he responded, "No, these two are red, this one is pink, this one is maroon." The patient was then asked to select all the reds again, but this time the skeins were immediately concealed as soon as selected. The patient then said, "Without comparison? I think I would have to compare. I would have to hold one in my hand and look for the others." The patient was unable to repeat under this new procedure the series made previously.

When asked to put all the greens together the patient picked up one green sample and said "I've seen grass this color." He then selected other shades of green saying, "This is the color of the grass in Virginia, this is the color of the grass in Kentucky," etc. He then placed a brown skein with a green skein and said, "This is the color of the bark of the tree and this is the color of the leaves."

The selection of skeins by this patient was made with great care and meticulousness and he paid close attention to each skein examined.

The behavior of the subject brings out the following points:

1. To the word "red" he selects only a few skeins. The word for him applied only to a certain shade of red and did not stand for a general category of red.

2. When a group of samples which the normal adult would call different shades of red were presented, the patient did not believe they could all be called red but that some were red, others maroon, etc.

3. When urged to select all those belonging with particular red samples the patient formed a pseudo-series of brightness. He brought together pairs that gave approximately equivalent sensory impressions and in this way built up what appeared to be a series of reds. The fact that he proceeded in this way was established by his being unable to carry out this procedure if the first skein was removed from his sight after it was selected so that he could not make these pair comparisons. After the pseudo-series (Cf. Goldstein and Gelb,[4] and Vigotsky[9]) had been built up, he did not be-

lieve that they all belonged together or that they might be called "red."

4. When asked to select the green skeins, the patient proceeded in a very concrete way. He could consider the shades only as colors of definite objects. He did not sort as to the category "green" but chose the colors by taking every shade as an individual thing.

B. *Color-Form Sorting Test*

The 12 cardboard figures were placed before the subject and he was asked to put those together that belonged together. The patient proceeded to sort them on the basis of form. After this sorting was completed, the patient was asked to sort them in another or different way. He proceeded to build a symmetrical design with the figures, forming a large pyramid. The figures were then reshuffled and the instructions repeated. The patient again sorted on the basis of form. The examiner then demonstrated the sorting according to color. When asked why they belonged this way, the patient said, "Because of their color." When asked why he had not done it in this way, he said, "Oh, I thought you wanted for the shape." The figures were then reshuffled and the patient asked to sort them. He again sorted on the basis of form. When asked to sort them the way the examiner had sorted them, he proceeded to sort for color. Two conclusions may be drawn from this performance:

1. There was a preference for form.

2. There was a difficulty in shifting from one aspect of the situation to another voluntarily.

The patient had no difficulty in grasping what was meant by the instruction to put those together that belonged together. His performance showed that he could sort for either color or form under particular conditions. He seemed unable, however, to shift from one type of sorting to the other when instructed to do so.

C. *Object Sorting Test*

The various objects were placed before the subject and he was asked to select any one he liked. He chose the large pliers. (What belongs with these?) The patient selected the toy hammer, toy pliers, toy screw-driver, lock, and nails. When asked why they

belonged together, he said, "Can use all these to pull a nail out and then open a lock maybe." This patient was then given a spoon and was asked what belonged with it. He selected first the fork and knife and carefully set them in the correct relative positions for setting a table. He then picked up a lump of sugar, saying: "Can use the sugar if we have coffee," and finally a cigarette, saying, "Can smoke a cigarette after the coffee." To the question of why they belonged together he said, "All for eating." The patient was handed a cigar, and he proceeded to pick up a single match and then the matchbox. He stated, "If it's a good cigar, would only need one match, if not, use the whole box." When asked if the cigarette could not also be included, he said, "No, those that smoke a cigar won't want a cigarette." A rubber ball was then presented and the patient said, "Can play ball with or without a glove. Nothing that's here belongs with the ball because there isn't a glove."

The second part of this test consisted in placing a particular group of objects before the patient and asking him why they belonged together. A group of toys was first presented containing toy eating utensils, toy tools, chocolate cigars, et cetera. (Why do these all belong together?) "If working and feel like eating then could eat the chocolate. The bell is something to play with, and the ball is something to play with." (Couldn't we say they are all toys, or something to play with?) "No, if you had to take a small screw out of a chair and tried for 15 or 20 minutes and needed a screw-driver of this size, it wouldn't be something to play with." A red cardboard circle, a red ball, and a red screw-driver were placed together. (Why do these belong together?) "This is for work (screw-driver), this is for play (ball), this is a marker, a sort of target (circle)." (Could we say that they are all red?) "Well, all red, maroon, light red or dark red." A large group of metal objects were placed together and the question again repeated. "Alike in the way of being used for something. Can use the lock to show people that you are not in. Ring the bell for warning. Could hang a coat on a nail if it were on a wall." (Could we say they

are all metal?) "Well, have some metal on them, but they are not all metal."

The patient's performance on this test brings out the following points.

1. The patient was primarily concerned with the practical use of the objects. He brought them together in terms of concrete situations, sorting them in terms of their use in a particular situation. For example, when given the ball, he had the impression that a baseball glove belonged with it, and inasmuch as the glove was not present, he said that nothing belonged with it. He identified the ball in a particular "frame of reference" and did not respond to common attributes of the ball and other objects that were present (similarity in form, color, et cetera), but which had nothing to do with the concrete use of the ball. The properties of form, color, and so forth, are not related to use together in a concrete situation.

2. When the objects were placed by the examiner in groups which might be obvious to the normal person, the patient was not able to state why they belonged together. For example, he could not accept different toys as a group of toys, but took each thing as a single object with which something concrete could be done. In the same way, he could not understand that we can form a group of objects based on their similarity of color. In this case he could only consider the objects in terms of their concrete use. The same performance was evidenced with objects of similar material (metal). He understood what "metal" means but he could not consider objects as belonging together because they were all metal. That they were all metal could not be considered a basis of using them together. The fact that they were of the same material does not mean anything for the use of the objects. He was not able to group certain objects on the basis of any single property (metal, color, et cetera), because these properties are not related to use together in a concrete situation. Such a performance would require the abstract attitude and the patient lacked this capacity.

D. *Kohs Block Test**

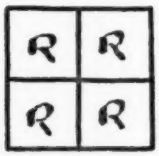
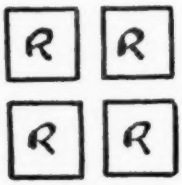


Figure 1—Sample I

When Sample I of the Kohs Block Test was presented, the patient first placed only one block and was apparently satisfied with his performance. He was then told that he must use all four blocks. He proceeded to place one on top of the other. When it was explained that this was not correct, he placed the four blocks in the following position.



Later he brought the blocks together in the correct relative positions.

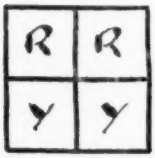
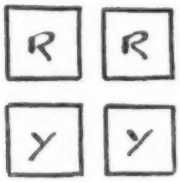


Figure 2—Sample II

The patient turned all four blocks to the red-white side. Then he turned the blocks again to find a red-yellow side, which, of course, was impossible to find. When the large card containing divided lines was presented he placed the blocks in the following positions:

*In the diagram of the Kohs Block designs, R—red, B—blue, Y—Yellow, W—white.



When the block model was presented, he copied it immediately without difficulty.

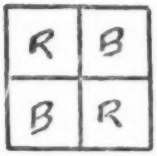


Figure 3—Card 1

The patient turned the blocks continually from side to side, apparently trying to find a side made up of red and blue. This procedure was unsuccessful. When the block model was presented, the correct solution occurred within a short time.

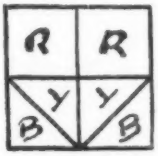


Figure 4—Card 2

The patient immediately placed the two blocks together forming a yellow triangle (such as occurs in the lower part of Figure 4). He was then unable to proceed. He turned these two blocks together, placing in several different positions. After many errors he finally placed the two red blocks correctly.

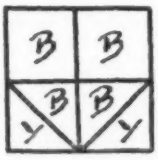


Figure 5—Card 3

The patient placed two blocks together forming a blue triangle, but was unable to proceed further. He continued to rotate these two blocks in random fashion, without success. When the lined model was presented, he was able to complete the design successfully.

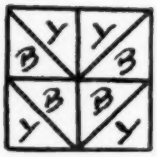
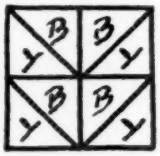


Figure 6—Card 4

The patient failed to solve the puzzle when the original card model was presented. When the large model and the lined models were given he also failed. His final performance when the lined model was given showed certain similarities to the correct design, as may be seen.



When the block model was given the patient was able to copy it successfully. Immediately following this success, the original card and the lined card were again presented, but the patient still failed to reproduce these successfully.

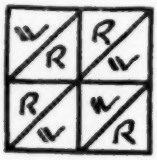


Figure 7—Card 5

The patient turned the blocks over and over again, apparently looking for a side containing a red stripe. He was then unable to proceed. The larger design was presented in which the card model and block reproduction are of the same size. He was still

unsuccessful and failed also with the design containing lines to outline the individual blocks. He was able to copy a block model with little difficulty. When the card design was again presented he still failed to complete it successfully.

* * *

In other designs that were presented, but which are not here included, he showed that he was always able to copy a block model and, on certain designs, he was able to copy the card design which is lined to show the boundaries of each block. He was unable to work from the small, original designs.

The performance of this patient indicated that his particular difficulty was related to the inability to proceed block by block in copying the design. Instead of proceeding in this way he attempted to reproduce those parts of the design which represent (also for normal individuals) some familiar configuration, such as an arrow, a triangle, a blue square, and others. Apparently these figures impressed him especially. Naturally, he could not succeed by trying to copy them with the given blocks. It is possible to reproduce these figures only if they are divided. There are no single blocks corresponding to a triangle or an arrow. The patient could not divide these figures into parts corresponding to the blocks. The normal individual may first be impressed by these figures, but he will readily see that he can succeed only by dividing them into blocks. This division requires an abstraction from the sense impression, which the patient was unable to do. He also had great difficulty in copying a design when there was a discrepancy in size between the model and block reproduction. This behavior was determined very exactly by the way in which the model was experienced by him. If that experience did not correspond closely to the blocks, he failed. This is because copying was possible for him, only by proceeding in a concrete way on the basis of his exact sensory experiences. Under these conditions he did very well. This is demonstrated by the ease with which he copied models built by the blocks themselves.

E. *Feature Profile Test*

The puzzle was placed before the subject with the parts scattered in random positions. (What do you think it is?) "Looks like a whole lot missing." (But what could it be if you put it together?) "It might be a face." The patient was then encouraged to proceed and he succeeded in placing the eye, nose and mouth with little difficulty. He then reached for the four square pieces forming the ear and attempted to fit them in the proper hole. His method was that of trying to fit the edges together. When one piece didn't fit he discarded it and picked up another. That he was not attending to the lines drawn on these pieces was shown by the fact that he continued to manipulate pieces without regard to whether they were right side up or not. The examiner then moved the four pieces to the side of the design and asked the patient to put them together the way they belonged. The patient was able to do this without difficulty. Following this, the patient was still unable to place the four pieces together correctly in the appropriate hole. Performances on this test indicated that the difficulty consisted in attending to the lines on the pieces and the shape of these pieces at the same time. When the task was simplified so that attention to only one aspect of the situation was necessary for solution, the patient performed adequately. He was confused and resorted to random manipulation of the parts of the puzzle when he was required to attend to both the lines and the shape.

Discussion

The results of the tests on this patient show marked similarity to the results usually found in organic cases, described by Goldstein and Gelb. Careful observation revealed that this patient's behavior was determined by some individual appearance of the given object which impressed the patient. These particular properties produced in him either an attitude for the use of the object or for characteristic figures. However, he was unable to succeed if success demanded an abstraction from these concrete impressions. When it was necessary to bring the objects together by an abstracting procedure in order to fulfill the task set, that is, by finding out a category under which they all belong, or by dividing

one of these characteristic figures into parts, the patient failed. He was not capable of understanding what we meant when we explained the abstract attitude to him in words or by demonstrating the procedure. His attitude was very concrete; he looked at the skeins, for example, as individual objects and not as representatives of a class. It may be stressed here that the patient whose performances have been described was a man of at least average intelligence, who, in his premorbid state, certainly was able to understand the abstract attitude. On the basis of performance on the series of tests presented, the following generalization can be made: the change in the patient is characterized by a *lack of ability to assume the categorical abstract attitude.*

The interpretations of the protocols of this patient find confirmation in the study of the other patients of the group. In some cases, it was more difficult than in others to determine the attitude from which the patient was proceeding. That the change in behavior described in the previous records was characteristic of the whole group of patients tested is illustrated by the following sample protocols.

Additional Protocols

Color Sorting Test

Case B. (Male, age 34, diagnosis: dementia præcox, hebephrenic type.) When asked to select all the skeins belonging with a particular red sample, the patient selected one skein which resembled the sample very closely. He then picked up another skein of red, held it over to the sample, and then rejected it. When asked why he didn't include it, he said "It is dark pink." He stated that there were no other skeins that belonged with the sample. When the examiner selected all the various shades of red and asked why they belonged together, or in what way they were alike, the patient stated that they weren't alike, but that they were all different.

Case C. Male, age 40, diagnosis: dementia præcox, hebephrenic type.) When asked to select all the green skeins, the patient picked up skeins in an apparently random order of brightness and saturation. As he picked up each one he gave it a specific color name: "peacock green, bell green, baby green." When asked in what

way they were alike, he repeated this color naming. To the question, "Could they not all be called green?" he agreed. This performance is similar to one described previously in which the patient brought the shades of green together taking every shade as an individual thing.

Color-Form Sorting Test

Case D. (Male, age 30, diagnosis: dementia præcox, hebephrenic type.) When asked to put those together that belonged together the patient sorted on the basis of color. The figures were then reshuffled and the patient required to do it in a different way. He repeated his earlier performance. The figures were then turned so that the white side was uppermost, and the only variable present under these conditions was form. When asked to sort them now, the patient arranged them on the basis of the form. The examiner then turned the figures to the earlier position in which the colored side was now apparent. The patient still sorted on the basis of form. He was not able to sort the colors when instructed to do it in a different way. The performance of this patient indicates he was controlled by one set of stimulus impressions and could not shift himself from these voluntarily. When the stimulus conditions were controlled so that there was but one possibility present, the patient sorted on the basis of form. Having once been brought into this attitude by changing the conditions, he continued to sort for form when both form and color were present. Thus, he could not shift voluntarily from color to form in the first part of the test, and after having been brought to attend to form, was then unable to shift from form to color.

Object Sorting Test

Case E. (Female, age 32, diagnosis: dementia præcox, catatonic type.) The patient was handed a cigar. (What belongs with this?) The patient selected the matchbox. (Select everything that belongs with it.) "And what else? Well, I need an ashtray. What would I use for an ashtray? Could I use this for an ashtray? (pointing to cardboard circle). Nothing else belongs." The patient was then handed a lump of sugar. "Nothing belongs with it. Could use it with coffee or tea. Some people like to eat

it alone but I don't." When asked what belonged with or was similar to the bicycle bell, the patient responded, "Nothing belongs with it. There's no bicycle." The patient continued to respond to the objects that were presented, stating that none of the other objects on the table belonged with them. When groups formed by the examiner (see p. 53) were presented, she was unable to state the way in which they were alike. This patient shows in extreme form the tendency to respond to objects in a concrete way. She could not understand them as representatives of a category to which other objects in the group might belong.

Case F. (Male, age 31, diagnosis: dementia præcox, hebephrenic type.) This patient selected a cigar from the group. When asked to choose all that belonged with it, he stated that there was nothing else. The other smoking materials (cigarettes, matches) were then grouped before him and he was asked whether these could not be said to "belong with" the cigar. The patient said, "No, they are not cigars." These objects were then removed and a fork was presented. The patient selected a spoon and a knife and placed them with the fork, saying, "These belong to the spoon family." When given a screw-driver, the patient selected the hammer, pliers, lock and bell as all belonging together. He said that they were "all of the family of the screw-driver." He then explained further that the hammer and screw-driver could be used to take the bell and lock apart. The patient failed to see the basis of similarity of any other large categories presented by the examiner.

As in the previous protocols, these patients seem impressed by particular uses of the objects presented and do not act in terms of broader categories. The most frequent type of grouping was in terms of use in a particular situation. The response of "nothing belongs" with a particular object also occurred. It is of interest to note that after objects had been grouped into categories by the examiner, the patient usually would not be able to state the basis of the similarity and when told the correct answer by the examiner, would not accept it.

Kohs Block Test

Case G. (Female, age 32, diagnosis: dementia præcox, catatonic type.) When the first design was presented the patient placed

one single block on top of the card. She was then told that she must use all four blocks, and she proceeded to set them one after the other in a row, several inches apart. When the large card was presented she reproduced the design without difficulty. She had been apparently troubled by the discrepancy between the size of the model and the size of the blocks. She was able to make this abstraction of size after the first design but always commented upon the discrepancy in size. She was also troubled by the slight difference between the colors on the blocks and on the cards. She completed the second and third designs successfully from the large model. On the fifth design, she failed even after the lined model was presented. The examiner demonstrated the correct performance but she was unable to reproduce it. The patient could not separate the designs into separate parts. Such separation requires the abstract attitude. The fact that she made the same type of error even after the demonstration suggests that the errors are tied up with a fundamental inability.

Feature Profile Test

Case H. (Female, age 28, diagnosis: dementia præcox, catatonic type.) The parts of the puzzle were placed in random order before the patient. (What do you think this might be?) "It might be a head." When instructed to put it together, she tried to fit the ear pieces into the appropriate hole, but paid attention only to the fitting of the edges and not to the lines. She attempted to force them into place incorrectly. The four pieces were then placed correctly for her and she was asked if she had seen that it was the ear before. She said, "No, the ear shouldn't be there." (Where should the ear be?) The patient then turned her own head at right angle to the plane of her body and felt the position of her ear with her fingers. She then lifted the four pieces of the ear in the puzzle and held them at a slight angle to the horizontal plane of the rest of the head. "You could fit it that way." She was apparently attempting to reproduce the angle the ear normally makes with the head in three-dimensional space. The patient was able to assemble the four pieces correctly when they were placed apart from the rest of the puzzle. Even after two demonstrations the patient was unable

to place these four pieces correctly in the whole design. Her performance is of interest as it suggests that her difficulty in handling this problem was in a lack of separating her own person from the object. She identified the profile in the puzzle with herself and attempted to find the correct position of the parts by fingering her own features. She tried to place the ear in the design in such a way that it extended in the third dimension; that was really a very concrete procedure.

The performance of all patients of the group indicated that their difficulty in solving the puzzle consisted in placing the four ear pieces successfully in the proper hole. They were able to assemble them correctly outside the hole. For the correct performance it is necessary to pay attention both to the shape of the pieces and the lines appearing on them. As has been pointed out previously, voluntary shifting of attention from one attribute to another requires the abstract attitude.

IV. Discussion

The results of these testing procedures indicate that these dementia præcox patients tend to respond in what has been here defined as a concrete way, where the normal individual may respond in either an abstract or concrete way. This greater concreteness cannot be regarded as an individual peculiarity of the patients tested, due perhaps to differences in innate intelligence or lack of education. The discussions of this point by Goldstein (p. 311[3]), Goldstein and Gelb[4], and Weigl[10], have already pointed out that the lack of the ability for abstract behavior has nothing to do with education. These writers pointed out that poorly educated people are often inclined to react in a more concrete way, but it is always possible for them to react in an abstract way in these tests as well. This holds true, in general, for normal individuals. Even children of eight and nine years with normal intelligence have been found to be capable of abstract behavior (Bolles[1]). The difference between the patients and the normal individual is that the patients are not capable of showing abstract behavior at all. The evidence that education has nothing to do with this factor is further substantiated by the fact that in patients who showed a defect in abstract

behavior very clearly, there was no doubt as to the high level of scholastic achievement. On the question of whether or not the lack of abstract behavior in a patient may be related to an innate intelligence defect, it may be emphasized that there was high general intelligence and ability insofar as concrete behavior was involved. There was no evidence of mental deficiency from the history. If we do speak of a defect of the intellect, we must speak of a special type of defect, characterized by a failure in all performances which require abstract behavior. Thus, it seems expedient to omit the phrase "intellectual defect" and to designate this loss in terms of the characteristic change which is demonstrated empirically, that is, a lack of the abstract attitude.

The performance of the dementia præcox cases studied shows great similarity to the results usually found in organic cases described by Goldstein and Gelb. While emphasizing this similarity, we do not wish to be misunderstood. We do not mean by this statement that schizophrenia is the same as an organic lesion of the brain. We mean that the effects of the disorders, which might be signs of diseases of a very different origin and kind, in these tests show the same characteristics. Certainly this in itself is a very interesting statement. How from here the problem of schizophrenia as an entity has to be approached we cannot discuss in this paper.

The present results are consistent with the investigations of Vigotsky, Hanfmann and Kasanin. Vigotsky stated that in schizophrenia the most important deterioration in thought was a disturbance or impairment in the function of concept formation. He pointed out that in schizophrenia there was a disintegration of concepts and a regression to the concrete, factual, "complex" forms of thought. He differentiated such associations from concepts by the former being based on a union that is concrete and mechanical (such as physical proximity, concrete similarity of certain parts, et cetera), while the concept consists of a general and abstract principle (p. 1066[9]). Such a differentiation is similar to the distinction of "concrete" and "abstract" that has been pointed out in the previous discussion.

Conclusions

1. From the results of the tests described we may conclude that a type of patient diagnosed as dementia præcox shows the difference in behavior previously described. The difference between the schizophrenic patients studied and normal individuals lies in the capacity for abstract behavior. Both the normal and abnormal show concrete behavior in certain situations where concrete behavior is adequate. In the sorting tests, the normal may not seem to differ from the abnormal as long as it is possible to perform a task successfully in a concrete way, but the normal individual is also able to sort in another, more abstract way which the abnormal cannot do. The abnormal proceeds in a concrete way on all sorting tests. Thus, the characteristic defect of the schizophrenic patients studied was an impairment of the capacity for the type of behavior we call "abstract behavior."

2. The tests applied in this investigation allow a differentiation between the capacity for abstract and concrete behavior. Performance on these tests allow judgment of whether the patient is able to proceed only in a concrete way or to proceed in both an abstract and a concrete way. Such judgment is reached by using tests made up of steps which demand more or less abstract behavior on the part of the patient.

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THE CLINICAL EFFECTS OF BENZEDRINE SULPHATE IN MENTAL PATIENTS WITH RETARDED ACTIVITY

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Following the article by Prinzmetal and Bloomberg[1] in December, 1935, dealing with the effects of benzedrine sulphate in narcolepsy, it seemed reasonable to us to study the clinical effects of this drug in states of retarded activity due to emotional causes. The stimulating effect of benzedrine had been well established. On the basis of the theory that continued states of retarded activity were in part, at least, dependent upon the lack of emotional stimulation through satisfying behavior, it was hoped that if these retarded patients could be stimulated sufficiently, the resulting activity might be guided into channels in which satisfaction could be forthcoming and progressive improvement of the mental and emotional state might result.

Material:

It seemed desirable to us in the beginning to subject the results of the therapy to rigid scrutiny in order to demonstrate as conclusively as possible what might be expected in the clinical use of this drug. Therefore, while benzedrine was used clinically in a great many patients showing behavior retardation, only those patients were selected for this study who had been in a retarded state over a considerable period of time showing little inclination to variation. All patients of the latter type who were in the hospital during the period covered by this report (January, 1936 to August, 1937) were used except for the exclusion of the following groups:

1. Patients over 50 years of age.
2. Contraindication due to increased blood pressure, cardiac disease or other physical cause.
3. Contraindication on the basis of psychotherapeutic issues.

Procedure:

A total of 70 cases was collected; 44 were diagnosed as schizophrenic, 21 as manic-depressive, and 5 as psychoneurotic (Table 1). The research was entirely clinical and although physiological re-

actions were studied, these were not made the center of attention and will not be reported excepting insofar as they reflect directly upon the clinical results.

Following the selection of a patient for this research the following procedures were instituted:

1. It was ascertained that the patient's behavior was reasonably constant, that the routine and special therapeutic procedures were instituted and well under way and that there was no prospect of any alteration in the daily program of the patient. This rule was made to exclude so far as possible as causes of behavior effects such things as other procedures of a new type or unusual activities and events.

2. A behavior chart somewhat similar to those in use at the Phipps Psychiatric Clinic was started in each case and continued for a period of one to three weeks before medication of any kind was exhibited in order to have a graphic representation of the patient's behavior as a base line for comparison. These were supplemented by ample daily nursing notes covering the entire 24 hours.

3. Benzedrine sulphate in doses of from 10 to 60 milligrams was given in aqueous solution (1 milligram per cc.) in order to permit facility of varying the dose within small limits.

4. A substitute solution made up to appear and taste as nearly as possible like the benzedrine solution, but without any active principle, was used in alternation with the benzedrine sulphate solution.

5. The individual procedure varied in each case following the establishment of a fairly constant behavior chart. At times the patients were started on the substitute solution and if no behavior effect (due possibly to suggestion) took place under these circumstances, after a period of 5 to 14 days the benzedrine sulphate was given in dose of equal voulme. The usual initial dose was 8 to 10 milligrams. If no behavior effect resulted after the course of several days, the dosage was gradually increased until it became clear that no increase of activity was to be anticipated with reasonable

dosage, or until adverse effects occurred in the form of marked increase of pulse or blood pressure, sudden outbursts of panic, increasing confusion or marked loss of sleep.

6. No benzedrine was given after 12 noon. At times the total dose for the day was given at 7:30 a. m. and at times it was distributed throughout the morning hours.

7. Whenever a favorable improvement in the patient's behavior took place and was well established on the behavior chart over a period of several days, the benzedrine solution was omitted and an equal volume of the substitute solution was given for a period of two to several days. If the improved behavior continued, the substitute solution was stopped and the patient was continued on the behavior chart without medication. If there was a decrease in the activity of the patient on instituting the substitute solution, as soon as this was well established on the behavior chart benzedrine was again instituted and the alternation of the two solutions was continued enough times and at sufficiently varying intervals to rule out as far as possible the occurrence of coincidence.

8. Blood pressure, pulse, respiration and temperature charts were kept on these patients throughout the period of study.

Favorable Results

Table 1 is a summary of the effects of benzedrine therapy in the various reaction types, distributed as to diagnosis. The results as recorded in this table apply only to changes in the status of the patient during treatment with the drugs, as revealed by nursing notes and behavior charts during the experimental period. No patient is recorded as improved or recovered under benzedrine:

1. Who did not show a constant behavior pattern over a period of two or more weeks previous to administration of the drug.

2. Who showed similar response to the substitute solution.

3. Who failed to show a relapse into the former retarded behavior on discontinuing the drug the first few times it was tried.

4. Who at any time showed a decidedly adverse response to benzedrine sulphate in moderate dosage.

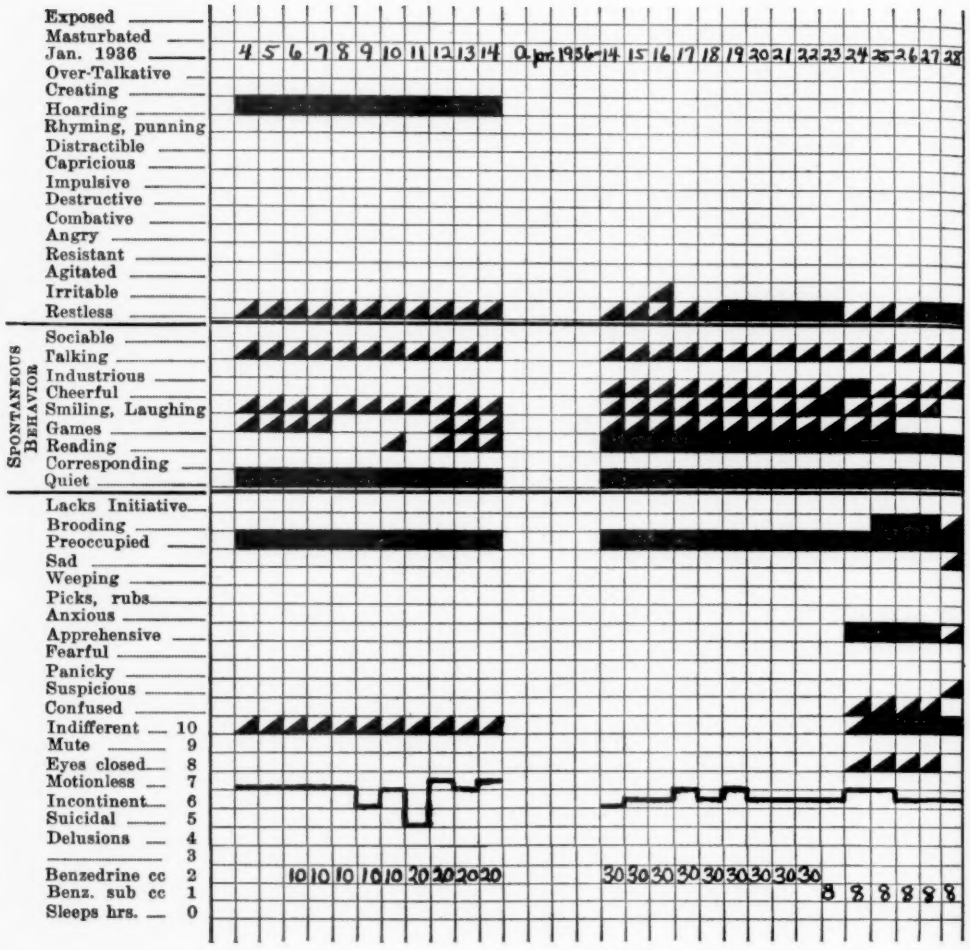
TABLE 1. EFFECTS OF BENZEDRINE THERAPY

	Recovered		Improved		Unaffected		Worse			
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	Totals	
Schizophrenia										
Catatonic	2		5		8		6		21	
Hebephrenic	0		2		2		1		5	
Paranoid	0		3		7		4		14	
Others	0		0		4		0		4	
	2	4	10	23	21	48	11	25	44	44
Depressive										
M. D. D.	1		3		11		2		17	
Agitated	0		0		2		1		3	
Involutional	0		0		1		0		1	
	1	5	3	14	14	67	3	14	21	21
Psychoneurotic										
Psychasthenia ...	0		0		3		1		4	
Hysteria	0		1		0		0		1	
	0		1		3		1		5	5
Grand totals ..	3	4	14	20	38	54	15	22		70

Retarded Schizophrenic:

Seven of 21 catatonic schizophrenics treated either recovered or improved during the treatment. In two of these cases increasing activity of the patient leading to recovery was only to be obtained on administration of the drug and was lost whenever the drug was discontinued and the patient lapsed back into the catatonic state. Psychotherapeutic access to these patients became possible through the improved mental state. These two cases are recorded as recovered not because we believe that the benzedrine caused the recovery but because it became perfectly clear that without the use of benzedrine therapeutic access to these patients would have been long delayed. Among the improved patients of the catatonic group are several interesting cases. Two of the patients of approximately the same age (25 and 28 years, respectively) with somewhat similar histories showed slight but increasing improvement with benzedrine sulphate in increasing doses up to 60 milligrams per

Figure 1



One square equals 1 day
White indicates no manifestation
Half white indicates slight manifestation } of activity listed at left
Black indicates marked manifestation

Behavior chart of a catatonic schizophrenic, age 25. First portion shows constancy of behavior prior to benzedrine administration with slight pick up in activity and occupation with doses of 10 to 20 milligrams benzedrine sulphate.

Second portion shows somewhat greater activity with 30 milligram doses and marked let down in activity when substitute solution was given. Such changes show consistently with every change of medication in this patient.

day. With administration of the drug there was progressive improvement of spontaneous activity and easing of affect, in both instances. Neither of the patients, however, talked during this period. On one occasion in response to a single dose of benzedrine sulphate 60 milligrams together with atropine sulphate grains 1/200 both of these patients showed a remarkable change. One of them began to talk in a friendly manner, asked to join certain games such as ping pong and pool and showed increased initiative. The other exhibited sudden impulsive activity, walking restlessly about the ward, banging his fists on walls, doors and tables and emitting a continuous stream of profanity. Both of these patients were under identical management throughout this period except that the one who had started to play games had succeeded in establishing a fairly easy relationship with one of the attendants. This experiment was not repeated. Benzedrine sulphate has been given to both of these patients intermittently throughout the ensuing period. On discontinuing the medication both of these patients would lapse back into deep catatonic stupor on each occasion. Both exhibit a tendency to more easy affect and more initiative at any time the drug is administered. Figure 1 shows significant portions of the behavior chart on a patient of this group.

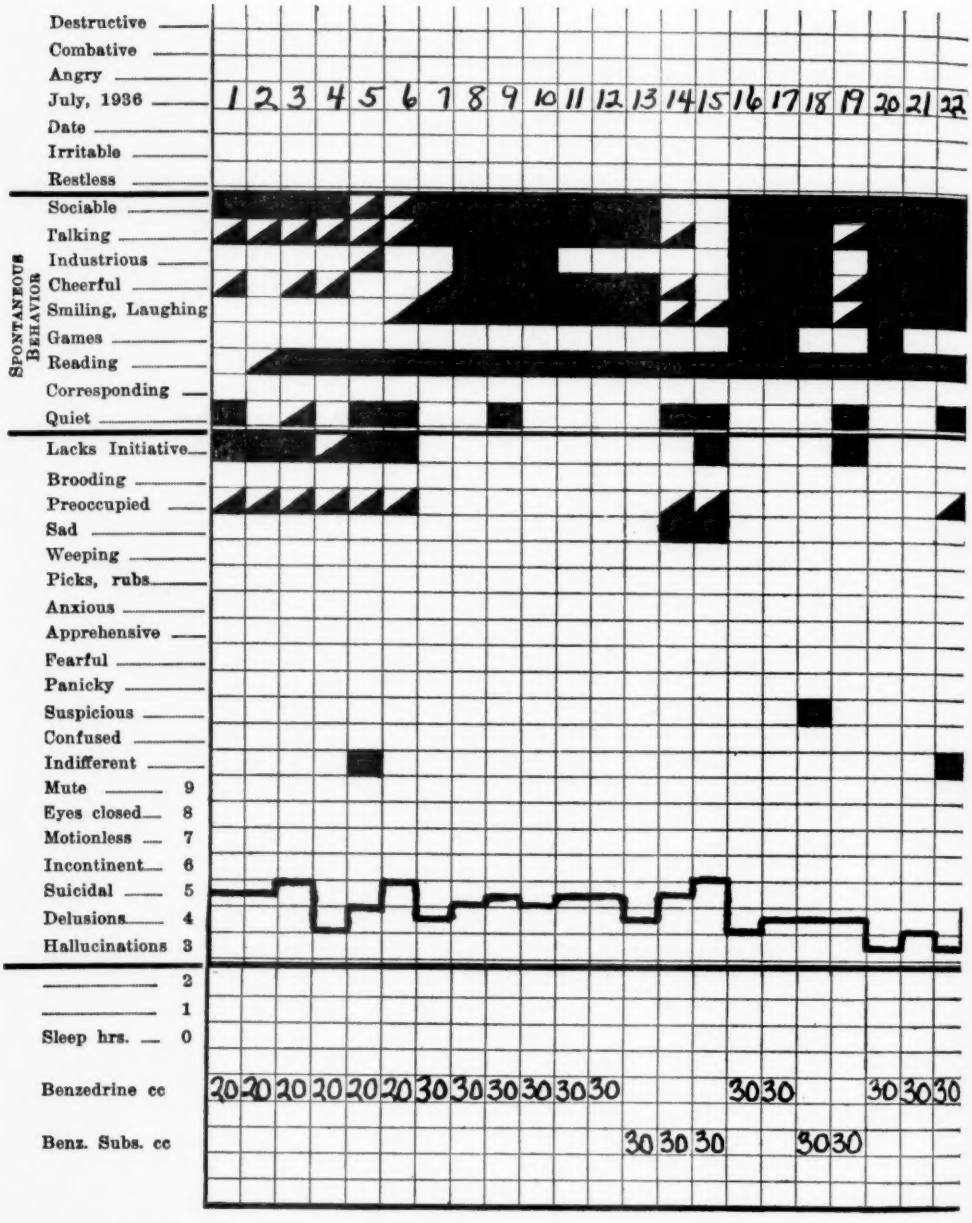
Two hebephrenic patients and three paranoid patients showed improvement in initiative and activity with some easing of affect. It was not possible to lead any of these patients to recovery during their periods of improvement. Delusions and hallucinations were not altered, but the affect became less tense and activity increased.

Twenty-one of the 44 schizophrenic patients (48 per cent) were unaffected by the drug. Eleven were made decidedly worse. The unfavorable results will be discussed more fully below.

Retarded Patients of the Thymic Group:

In this group there were 21 patients, 17 of whom had been diagnosed as manic-depressive, depressed; three manic-depressive, mixed (agitated type); and one involutional melancholia. Of this group one patient recovered and three showed definite evidences of improvement under benzedrine sulphate administration. All who improved and recovered were patients diagnosed as manic-depres-

Figure 2

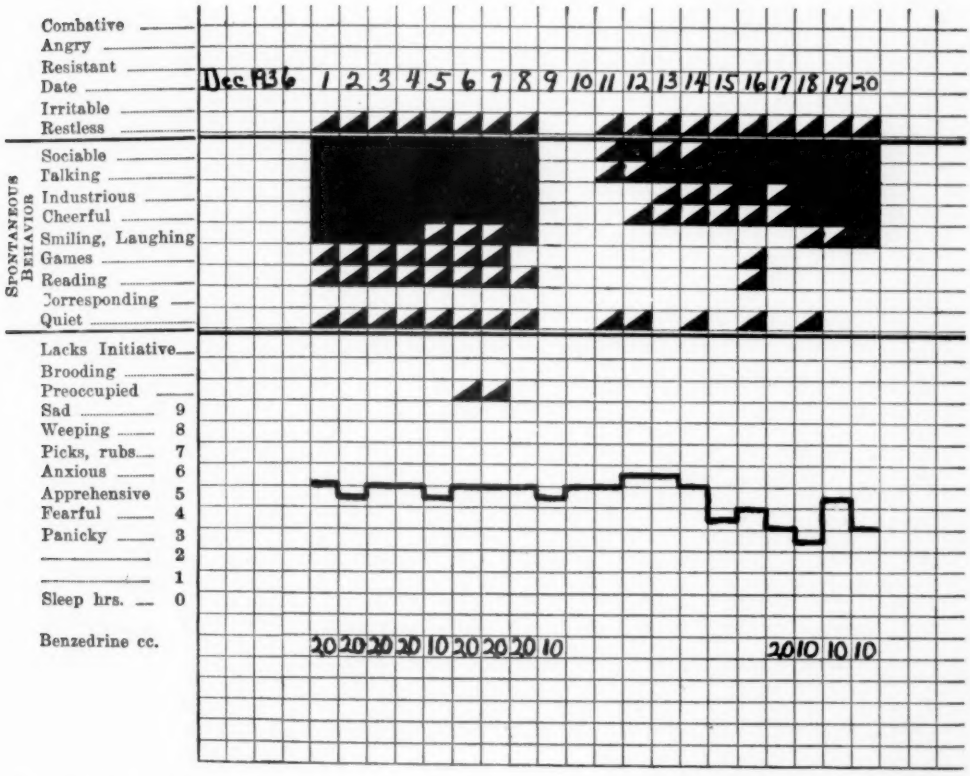


One square equals 1 day
White indicates no manifestation
Half white indicates slight manifestation } of activity listed at left
Black indicates marked manifestation

Behavior chart of patient with hysteria and retarded activity. Shows increased activity on 20 to 30 milligrams benzedrine sulphate with slump in behavior when inactive substitute is used. This result can still be regularly repeated.

sive, depressed. The one patient who recovered in this group was one of the first patients to whom the drug was administered, and she showed a startling response. This girl had sat for months in a corner of the ward, depressed, sullen, inactive, and unresponsive to continued and persistent efforts at treatment. There was no tendency to improvement until benzedrine sulphate in doses of 10 milligrams was started. There was an immediate response to the drug and on the first day it was administered she was up about the ward helping the nurses with the ward work and responding somewhat to attempts at conversation. This improvement continued for seven days until the benzedrine was discontinued and the sub-

Figure 3



Same patient as shown in Figure 2 after six months have elapsed. This chart shows the slump in normal activities when no medication is given and tendency to restoration of activity on small doses of benzedrine. For two days the patient visited out but that stimulus was not sufficient to keep up her activities. Similar visits out while continuing benzedrine result in no such let down.

stitute solution administered, whereupon the patient returned to her corner and remained inactive and mute until five days later benzedrine was again started whereupon her former activity began. After her improvement had continued for two weeks the benzedrine was again discontinued and substitute solution administered whereupon there was a corresponding slump in her activity and initiative. After three days benzedrine was again started and the patient was continued on the drug until she was carrying a full active day. Psychotherapy was attempted in this case without results as the patient steadfastly refused to deal realistically with the social and personal problems precipitating her illness. It is of interest that this patient spontaneously objected to the medication and asked for its discontinuance when her behavior had reached an approximately normal level.

In the three manic-depressive cases recorded as improved under benzedrine medication we were able to demonstrate beneficial effect from the drug although the results were in no respect comparable to those seen in the patient discussed above.

Psychoneurotics with Retarded Behavior:

In this group we have only five patients. The only one of these to improve was the single patient diagnosed as hysteria who was regularly beneficially affected. This patient has been carried now for 19 months on benzedrine in doses of from 10 to 30 milligrams per day. Without it she is languid, complaintive, feels unable to rise from bed until 11 o'clock in the morning and sits about the ward relatively inert. With 10 milligrams of benzedrine sulphate administered at 7:30 in the morning the patient shows some improvement. With 20 milligrams there is greater improvement and with 30 milligrams she is able to be up and about and carry on a full day's activity. She has been under psychoanalytic treatment for the past three and one-half years antedating by two years the beginning of benzedrine treatment and continuing without interruption to the present time. Many times during the experimental period benzedrine has been withdrawn and the substitute given. In each instance her behavior has reverted to the former state of inertia. Her analyst believes that the benzedrine has been helpful in furthering the analytic treatment. Figures 2 and 3 illustrate

her general inertia without medication, her response to benzedrine, and her lack of response to the substitute solution. There is some question as to whether this patient might properly be classed as schizophrenic.

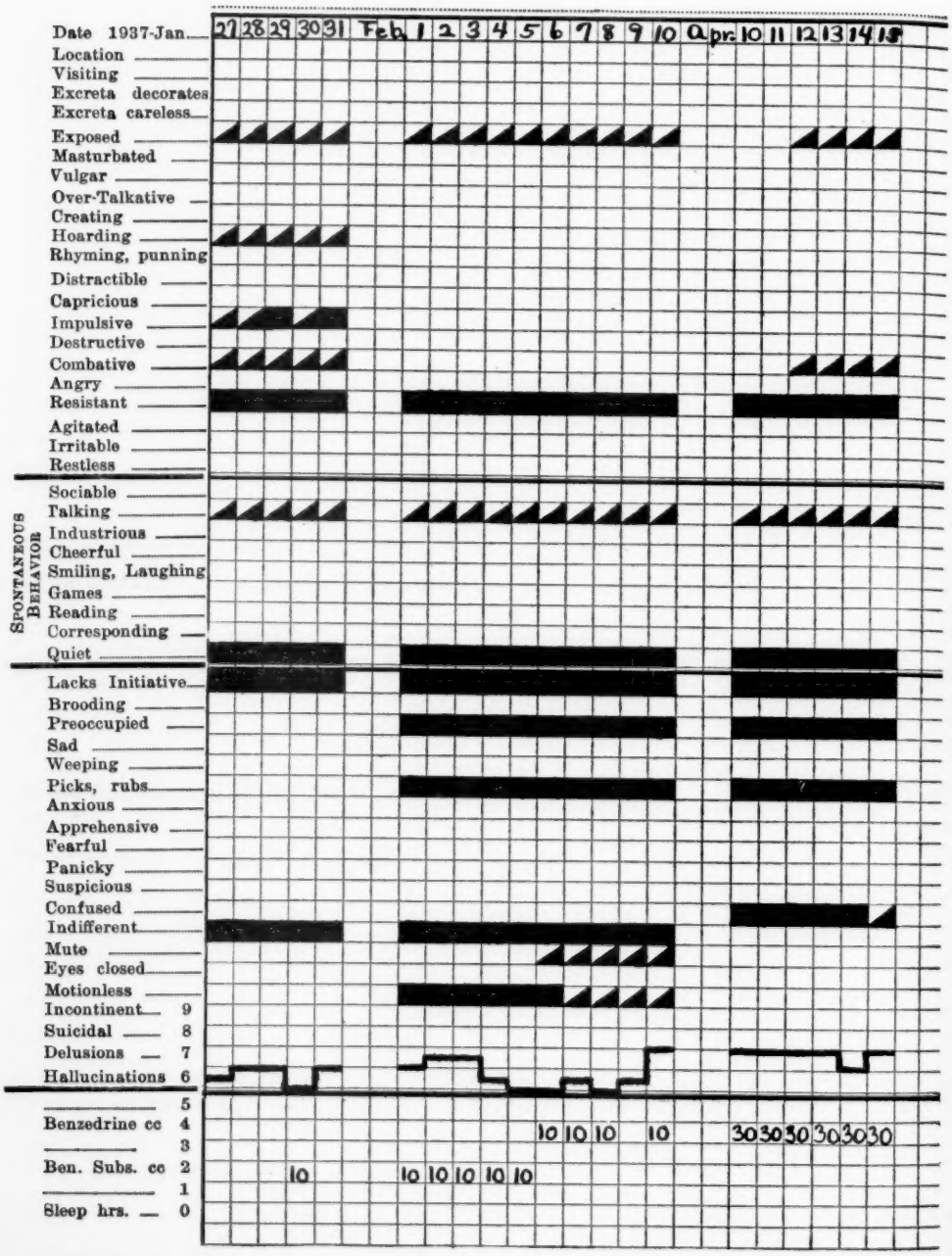
Unfavorable Response

Approximately 50 per cent of the patients were unaffected by the medication, regardless of diagnosis, in doses as high as 30 to 60 milligrams. Although there are some differences in the individual groups this does not seem significant with so small a series. In general it was noted that if the patient failed to show some slight favorable response to doses as low as 10 milligrams, larger doses failed to elicit any response or resulted in unfavorable reactions. Figure 4 shows the failure to respond to the drug.

Among the more unfavorable responses was the precipitation of panics in tense or agitated, depressed or catatonic individuals. Figures 5 and 6 illustrate this type of reaction. Frequently the onset of panic was preceded or accompanied by the sudden occurrence of a sleepless night or two. In one of the tense, depressed patients of the manic-depressive group the administration of benzedrine precipitated a serious impulsive attempt at suicide by ramming the head against the wall. From the behavior standpoint we should note as warnings of impending unfavorable results, therefore, inroads upon the sleep curve, evidences of growing tension including increase of pulse rate or mounting blood pressure effects or increasing evidences of apprehension. In a few of these patients an attempt was made to try the effect of very small doses, 4 to 6 milligrams. In all but one of these the effect after a few days of medication was to precipitate another panic. In one instance on the administration of 4 milligrams of benzedrine sulphate the patient showed slight improvement of affect and greater ease and continued to emerge from his state of catatonic tension to a state of silly hebephrenic affect and activity. This, of course, may have been merely a coincidental event.

Blood pressure effects in the nature of a rapidly mounting systolic and diastolic level may occur. Two patients showed this effect. In one of these with a daily dose of 20 miligrams of benze-

Figure 4

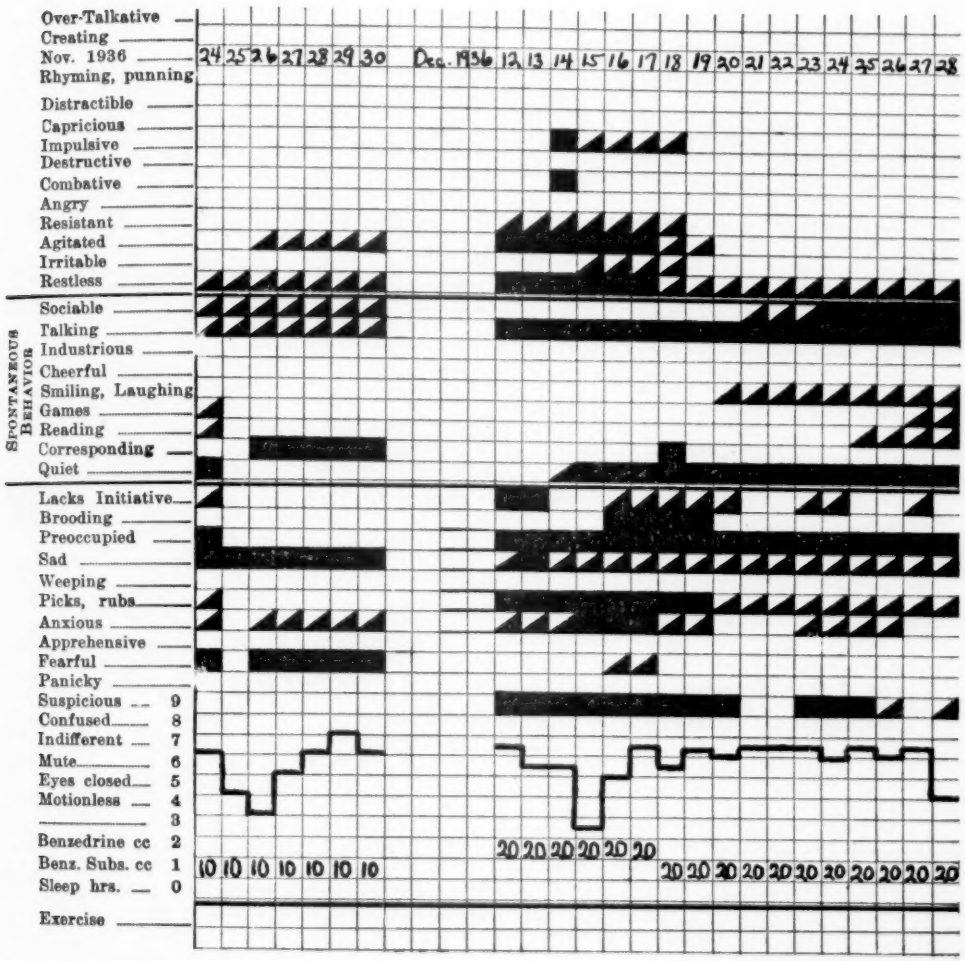


One square equals 1 day
White indicates no manifestation
Half white indicates slight manifestation } of activity listed at left
Black indicates marked manifestation

Significant positions of behavior chart of catatonic schizophrenic woman. Although there was a recession of impulsive activity after the substitute was started, there was no real change in patient's status. Likewise there is no response to benzedrine sulphate in gradually increasing doses up to 30 milligrams. There was also no effect on pulse rate, blood pressure or sleep curve.

drine sulphate both systolic and diastolic pressures regularly mounted on successive days from an original level of 130/78 at starting to 170/110 seven days later. This change was accompanied by increasing anxiety. These effects subsided when the benzedrine was stopped. The second patient showed a similar tendency to progressive blood pressure increase on 20 milligrams doses, but without behavior change.

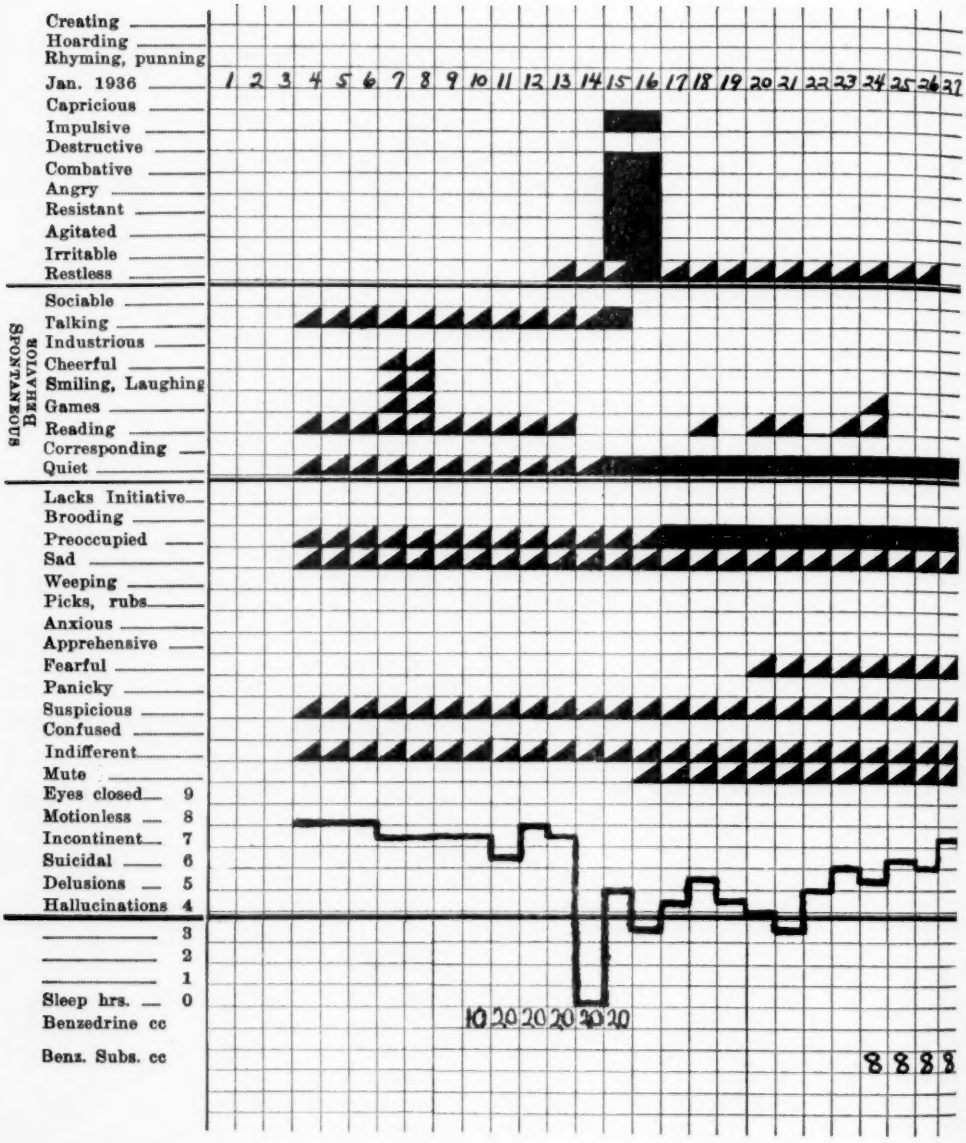
Figure 5



One square equals 1 day
White indicates no manifestation
Half white indicates slight manifestation
Black indicates marked manifestation
} of activity listed at left

Significant portions of behavior chart of an agitated depressed patient showing no response to substitute solution, but sudden panic (in which a serious suicidal attempt was made) when given benzedrine sulphate milligrams 20. Milder panics could be precipitated by smaller doses. Note sleep disturbances. There was little pulse or blood pressure effect.

Figure 6



One square equals 1 day
White indicates no manifestation
Half white indicates slight manifestation } of activity listed at left
Black indicates marked manifestation

Behavior chart of catatonic schizophrenic showing precipitation of panic with benzedrine. This result could be elicited in milder form with daily doses as small as 4 milligrams. Note sleep disturbance. Pulse rate and blood pressure were not noticeably affected until panic started.

Anomalous and Variable Results

Among the patients treated were several who showed slightly favorable results with improved affect and behavior over a short period of time with rapidly ensuing unfavorable effects the causes for which could not be determined.

In one of our patients who showed no other response to the drug there was a slight lowering of the blood pressure levels (20 millimeters of mercury systolic, 10 millimeters diastolic) with the administration of 10 milligrams of benzedrine sulphate over a period of one week. On stopping the benzedrine the blood pressure returned to its former level. This result could not be repeated.

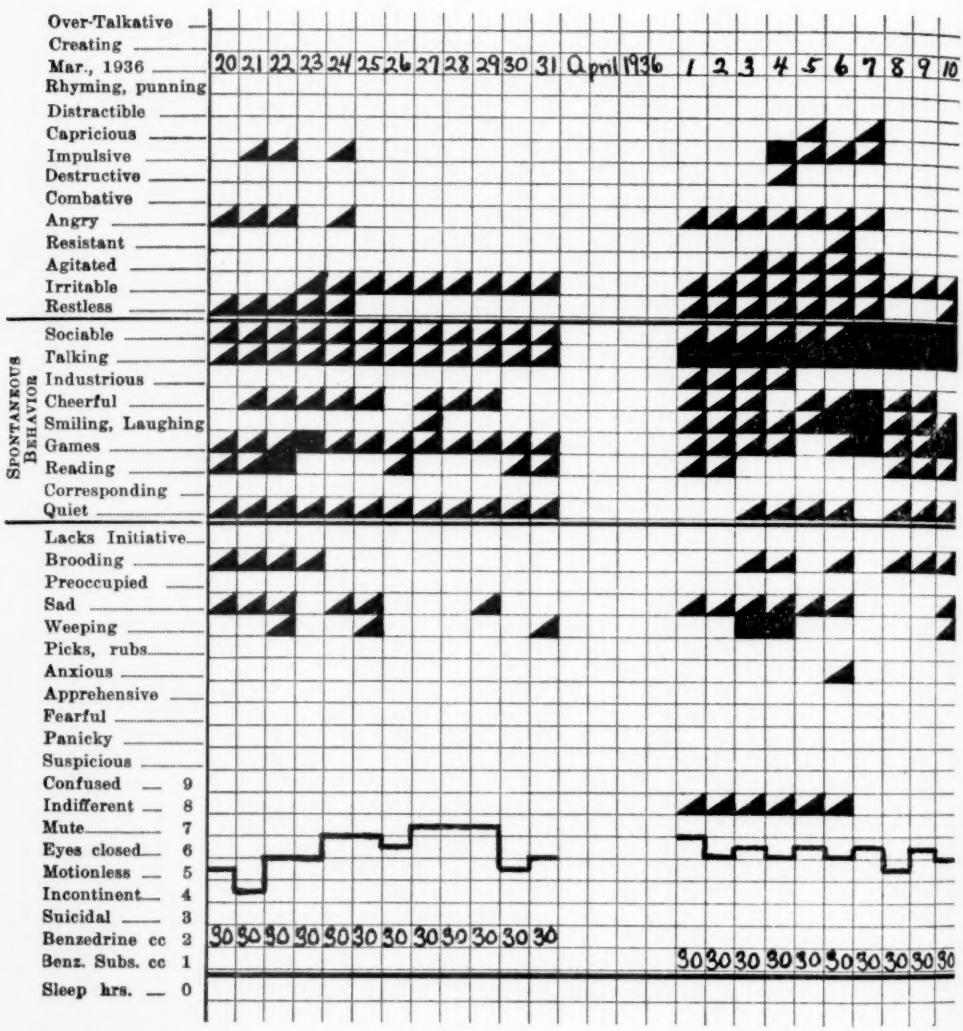
An occasional patient who showed no response during benzedrine administration showed regularly a period of several days increased activity after the benzedrine was stopped, whether or not the substitute solution was given. Figure 7 illustrates this effect in a schizophrenic woman who subsequently achieved social recovery.

Relationship of Results to Vagotonic or Sympatheticotonic Status of the Patient

Thirty-four patients from the above group (all of the patients under treatment during the three months period from June 1 to September 1, 1936) were tested for their response to pharmacodynamic drugs (atropin, eserin and adrenalin) and the clinical status evaluated in an effort to determine the dominance of the vagus or sympathetic systems. Table 2 is a summary of these results. It is to be noted that approximately half of the patients failed to fall in either group and the remainder were divided equally between sympatheticotonic and vagotonic reactions. The heading in the table, "neither or both," includes one catatonic patient who showed a sharp sympatheticotonic response (which could not again be elicited) on one occasion and a sharply defined vagotonic response two days later without manifesting in the slightest degree any change in his behavior coincidentally with this reversal. It is worthy of comment that both sympatheticotonic and vagotonic reactions were found in both manic-depressive and schizophrenic states and in the latter in both the paranoid and catatonic conditions.

The distribution of these reactions according to diagnosis is given in Table 3. It is seen from these tables that vagotonic or sympatheticotonic states have little or no relation to clinical improvement in patients showing retarded behavior.

Figure 7



One square equals 1 day
White indicates no manifestation
Half white indicates slight manifestation } of activity listed at left
Black indicates marked manifestation

Behavior chart of schizophrenic woman who showed no response to benzedrine but increased activity when it was discontinued and substitute was given. This effect could be repeated in this case.

TABLE 2. EFFECT OF BENZEDRINE ON VAGOTONIC AND SYMPATHETICOTONIC SUBJECTS

	Improved	Unaffected	Worse	Total
Sympatheticotonic	3	3	3	9
Vagotonic	4	3	2	9
Neither or both	5	8	3	16
Total	12	14	8	34

NORMAL CONTROLS

A group of twenty-five normal individuals to whom the drug has been given in doses of 10 to 20 milligrams reports a wide diversity of response. Many of them are pleasurably stimulated by the drug, especially in mild states of fatigue. One subject is regularly made drowsy by it and experiences difficulty in concentrating. Another complains of light-headed and giddy feelings. One subject shows variable response, being made sleepy by it on some occasions, on others stimulated to wakefulness. About half of the normal subjects are reluctant to take a second or third dose. These results are quite different from those of Meyerson[2] and indicate that benzedrine sulphate in normals sheds no light upon the variable responses in the retarded mentally illl except to indicate that the variability is an individual characteristic.

SUMMARY AND CONCLUSIONS

A total of 70 patients falling in the groups of the various functional disorders have been treated with benzedrine sulphate over a period of some 6 to 19 months with response to the drug carefully checked and controlled. Roughly it could be demonstrated that about 25 per cent of the retarded patients in all diagnostic groups may be improved by the administration of the drug. About 25 per cent of the retarded patients in all diagnostic groups are made much worse by its exhibition. Approximately 50 per cent appeared to be not affected.

The response to benzedrine medication cannot be predicted from clinical examination of the patient nor from application of pharmacodynamic tests. In general those patients who showed evidences of agitation, or fear and anxiety were either not materially affected by benzedrine sulphate in the doses exhibited or were made worse.

TABLE 3. EFFECTS ON SYMPATHETICOTONIC AND VAGOTONIC SUBJECTS DISTRIBUTED AS TO DIAGNOSIS AND RESULTS

	Sympatheticotonic	Vagotonic	Neither or both	Total	
Schizophrenic					
Paranoid					
Improved	0	0	1	1	
Not affected	1	1	3	5	
Worse	0	1	1	2	
Total	1	2	5		8
Catatonic					
Improved	1	2	2	5	
Not affected	2	1	0	3	
Worse	3	1	2	6	
Total	6	4	4		14
Hebephrenic					
Improved	1	0	1	2	
Not affected	0	0	1	1	
Worse	0	0	0	0	
Total	1	0	2		3
Others					
Improved	0	0	0	0	
Not affected	0	0	2	2	
Worse	0	0	0	0	
Total	0	0	2		2
Total schizophrenic	8	6	13		27
Manic-depressive					
Improved	1	1	1	3	
Not effected	0	1	1	2	
Worse	0	0	0	0	
Total	1	2	2		5
Psychoneuroses					
Improved	0	1	0	1	
Not affected	0	0	1	1	
Worse	0	0	0	0	
Total	0	1	1		2
Grand totals	9	9	16		34

Altogether similar patients, however, were in several instances improved by proper benzedrine dosage.

Since patients who reacted favorably to the medication showed practically immediate improvement on the administration of 10-milligram doses over a period of from one to three days, this can be used as probably the best index of what is to be expected.

Lack of response to small doses or unfavorable response to small doses should be taken as an indication for discontinuing the medication. It is true that for the most part our patients were very seriously ill individuals, suffering from major psychoses, but the very serious and sudden manifestation of impulsive suicidal attempts or gross panic might very well take place in patients manifesting less obvious signs of the severity of their conditions since very unpleasant effects are not uncommon even among normals.

It seems conclusively demonstrated from the above results that benzedrine sulphate properly administered in states of extreme depression and retardation *may on occasion* determine the difference between prolonged serious illness and fairly prompt recovery. It is also demonstrated that a large number of retarded patients regardless of diagnostic grouping can be materially benefited in their feelings of well-being and in their initiative. On the other hand, the administration of the drug is not without its attendant dangers and promiscuous and uncontrolled use is to be seriously condemned.

Our results are similar in some respects to those of other writers but not so optimistic, and few have warned sufficiently of the unfavorable effects to be encountered in many patients even with small doses.

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SEROLOGY IN GENERAL PARESIS*

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A. GENERAL CONSIDERATIONS

The data presented herein cover all available serological information on patients treated at the New York State Psychiatric Institute and Hospital from 1923 to 1935 inclusive. The total time included in the survey is somewhat over twelve years. During this period there were over 300 patients under treatment. Our reports sometimes refer to different numbers of patients, the differences being due to the number of patients accessible at any given time to the different laboratory tests employed.

The report refers only to patients with adult acquired general paresis and does not include any of the juvenile forms. Moreover the patients were carefully selected on the basis of suitability for the treatment planned for them. Patients who were to have the heat form of treatment had to meet the requirements that are commonly laid down for heat therapy. Likewise, patients entering the hospital for the purpose of getting chemotherapy were carefully selected. There was no selection made on the basis of duration of psychosis before treatment was instituted. Furthermore, there was no selection with regard to the clinical condition of the patient unless there were clinical signs and symptoms that would contraindicate the employment of a given method of therapy. It is perhaps unnecessary to state that no selection was made on the grounds of severity of the serological reports. Each patient reported upon exhibited serological data (in addition to clinical findings) that placed the patient in the general paretic diagnostic grouping.

From the standpoint of therapeutic response there is no unanimity of opinion among investigators that sex plays a decisive rôle. It will be noted that among our patients the ratio of males to females was approximately two to one.

Chart I and Tables 1 to 5 summarize serological data with reference to all the patients available for study, irrespective of the

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type of therapy employed. It was thought desirable first to gain a general appreciation of the results of modern methods of therapeutic approach to general paresis. The methods used by us included fever therapy(malaria and electropyrexia) and chemotherapy (tryparsamide and mercury). In subsequent charts and tables serological data referable to specific methods of approach are presented.

1. *Blood Wassermann* (Chart I and Table 1)

When we reviewed the blood Wassermann reactions of all patients, irrespective of the kind of treatment they received, it was observed that 8.1 per cent had a negative blood Wassermann reaction prior to therapy. Within a few months after treatment was completed, approximately 17 per cent of the patients had a negative blood Wassermann reaction. At the end of five years, when we examined 96 of the original 322 patients, almost 43 per cent of the patients had a negative blood Wassermann reaction. At the end of 10 years, with observations covering 28 patients, 75 per cent of them had a negative blood Wassermann reaction. We are impressed with the general observation that serological improvement appears to become more pronounced during the third and fourth years following therapy. With regard to the blood Wassermann reaction from the standpoint of sex, it appears from our own statistics that negative responses are higher during the first three years in men than in women, almost twice as many men as women showing negative reactions. During the fourth year the percentage of negative responses is approximately equal in both sexes. During the fifth, sixth and seventh years negative blood Wassermann reactions in women are appreciably higher than those in men. At the end of 10 years, when we examined 28 patients of the original group, negative blood Wassermann reactions were approximately the same for both sexes (76.5 per cent for males and 72.7 per cent for females).

It is interesting to note that at the end of 10 years there were no women and only 5.9 per cent of men who showed a strongly positive blood Wassermann reaction. Almost all of the patients studied by us showed a progressive decline in the intensity of

the blood Wassermann reaction, even though they did not reach the level of negativity.

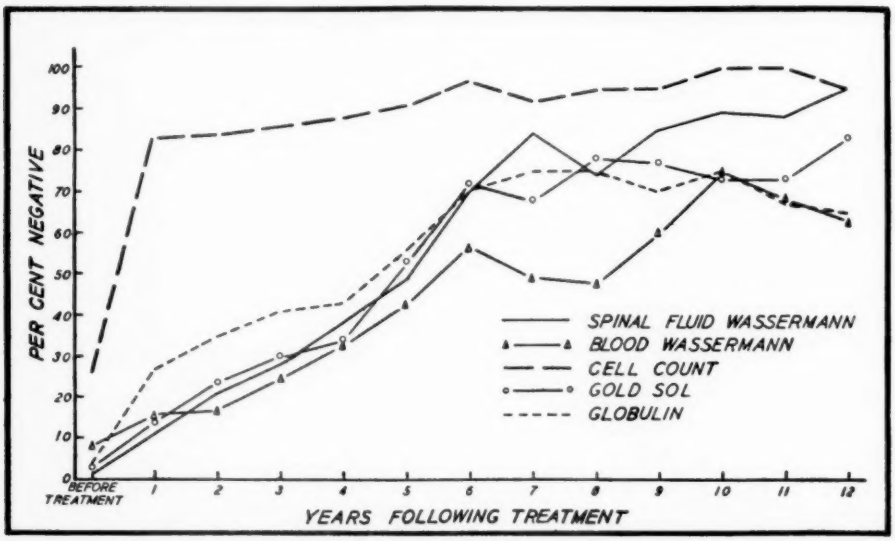

Chart I—Percentage of Patients and Negative Serological Results

2. *Spinal Fluid Wassermann Reaction* (Chart I and Table 2)

Taking the total number of patients into consideration, without respect for methods of therapy, among 321 patients, 0.6 per cent had a negative spinal fluid Wassermann reaction before treatment was instituted. At the end of the first year of treatment 10.6 per cent of the patients had a negative reaction. The negative responses showed a progressive increase at the end of the fifth year (observations on 98 patients), having then been 49.0 per cent and at the end of the tenth year (with 28 patients available) having been 89.3 per cent. At the end of the twelfth year, of 19 patients available for examination, almost 95 per cent had a negative spinal fluid Wassermann reaction.

It may be observed, with reference to Table 2 that, from the standpoint of sex there appears to be nothing essential from a statistical point of view, both sexes exhibiting increased frequency of negative spinal fluid Wassermann reactions with the passage of years. At the end of 10 years when 17 male and 11 female patients

were available for examination, negative spinal fluid Wassermann reactions were approximately equal in both sexes.

Before treatment 89.4 per cent of all the patients showed a strongly positive spinal fluid Wassermann reaction, whereas at the end of five years only 14.3 per cent of 98 patients had a strong reaction. Of 28 patients examined at the end of 10 years, 3.6 per cent were strongly positive.

3. *Cell Count* (Chart I and Table 3)

It may be seen that the different serological responses, while taking the same general course, vary as to the time when they become negative. As has been pointed out by numerous investigators, changes in the cell count constitute one of the earliest phenomena, a return to normal or near normal occurring as a rule shortly after the cessation of treatment. This trend towards negativity of spinal fluid cell count is maintained for years. Although there is a difference of opinion as to what constitutes the normal number of cells in the spinal fluid, we believe that any number above eight cells per cubic milimeter may be above normal.

With regard to cell count, from the standpoint of sex, it was our experience that the cell count in women responded more promptly than that in men.

4. *Globulin Content* (Chart I and Table 4).

Likewise, in conformity with the observations of others, the globulin content of the spinal fluid becomes modified during the early months and years following treatment. However, it lags appreciably behind the improvement noticed in the cell count and, taking a large series of patients together, it does not become negative as frequently as the cell count does. According to our findings there is a general increase in globulin content beginning approximately ten years after treatment has been ended. Whether this tendency to increased globulin content has any special bearing we are unprepared to say.

Attention is called to the fact that during the later years of our observations the number of patients that we were able to reexamine was decidedly less than the number with which we originally began. Therefore, all serological data that we had at our disposal

during the last quarter of the twelve-year survey are not as convincing as those of the first three quarters, because the total number of patients available for study was appreciably less. As a rule, long-continued observations are possible among the patients who remain unimproved and among those who have relapses. They remain with us because they have symptoms, for which they desire treatment. On the contrary, a certain number of patients who have no symptoms fail to return for further examination.

Regarding globulin content, there was a steady rise in the number of patients who showed a negative globulin response, the rise progressing steadily during the first five years; there was a relatively sharp rise from the sixth to the tenth year after treatment and a decline during the last two years of our observations, that is, during the eleventh and twelfth years.

When the negative globulin responses are studied from the standpoint of sex, it appears that while negative results in globulin content appear later in women than in men, as the years go by, more women than men show a negative response. For example, at the end of 10 years, 64.3 per cent of male patients and 90.0 per cent of female patients exhibited negative globulin reaction. The number from which to make such a computation is obviously small, comprising 14 male and 10 female patients. At the end of the five-year period, however, with 97 patients (63 males and 34 females) under observation, the percentage of negative globulin reactions was approximately the same (for the males 54 per cent; for the females 58 per cent) for both sexes.

When the globulin responses, recorded as one plus, are combined with those recorded as negative, the total runs relatively high.

5. *Gold Sol* (Chart I and Table 5)

Of the total number of patients, namely 315, three per cent showed negative gold sol curves before any treatment was given. At the end of one year, 14.0 per cent of the patients had a negative gold sol curve. At the end of the fifth year the percentage of negatives was 53.2; at the end of the tenth year, with 28 patients available for examination, the negative responses amounted to 73.1 per cent. The highest percentage of negatives occurred at the end of

the twelfth year, when in 18 patients, the percentage of negative responses was 83.3.

No fundamental differences were observed in the gold sol curves on the basis of sex. Certain inequalities of negative responses between men and women may be seen, but it is not felt that they represent anything essential.

B. Relationship of Serology to Clinical Condition

1. *Serology, Combined Statistics for All Patients.*

This section comprises comments on Charts II and III and Tables 6-10 inclusive. The clinical condition of the patient is compared separately with each of the serological tests referred to in this communication. For example, the clinical condition is pictured with reference to the blood Wassermann reaction, the spinal fluid Wassermann reaction, the cell count, etc. Observations on the clinical and laboratory status of each patient were made simultaneously.

The Tables 6 to 10 inclusive have no reference to individual methods of therapy, but give a general survey of clinical and laboratory results under the three modern forms of treatment of patients with general paresis. In the next chapter there will be a comparison of clinical and laboratory results from the standpoint of the three individual methods.

We believe it to be unnecessary here to define the terms "remission," "improved" and "unimproved," because we use the terms in the same sense that they were described in our monograph, "Electropyrexia in General Paralysis."

As a rule, tests were performed on those who died, shortly before their death. In a small percentage of patients examinations were made not more than three months prior to death.

Clinical condition and blood Wassermann reaction. (Chart II and Table 6.) Among the patients who gained a remission, there was a steady increase in the percentage of negative blood Wassermann reactions. It is to be noted that in the remission group, 12.2 per cent of the patients had a negative reaction before treatment was started. This number (12.2 per cent) may have some bearing

when compared with the percentage, 6.4, of negatives before treatment in the improved group; with the percentage, 3.2, of negatives before treatment in the unimproved group; and with 11.9 negatives before treatment in those patients who later died.

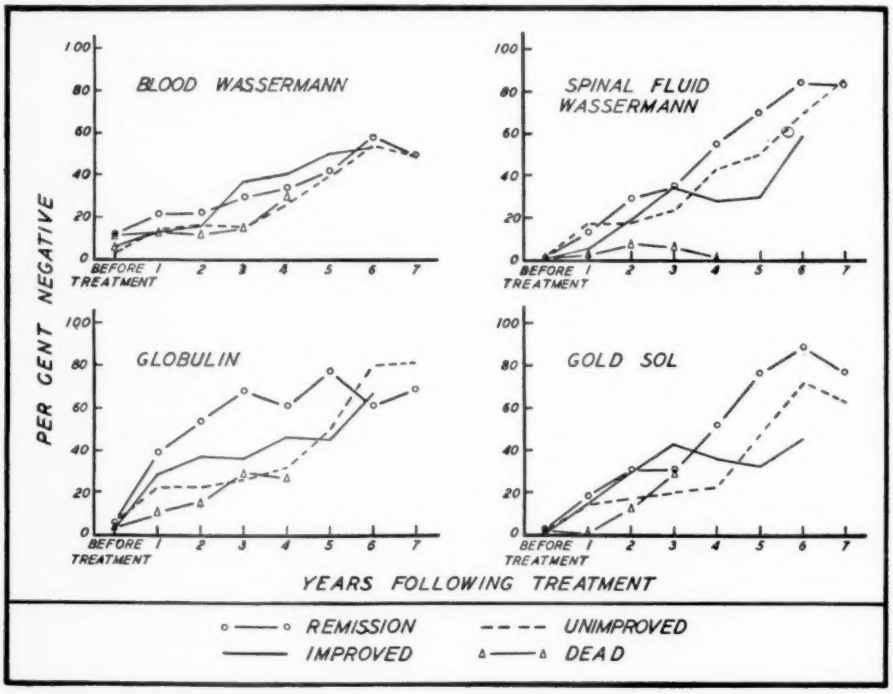

Chart II—Clinical Condition and Serological Results

Among those patients who gained a remission, the percentage of negative reactions at the end of the first year was 21.2. The comparative figure in the improved group was 12.8; in the unimproved group 14.4; and in the dead group 12.8. It seems therefore that in those patients who gain a remission there is a more rapid reduction of the blood Wassermann reaction than there is in the remaining three groups. This trend of reduction is seen not only after the first year but continues for the next few years. At about the fifth year the percentage of negative reactions is approximately equal in the three living groups.

Because the patients who remain unimproved usually have continuous hospital residence, it is possible to have continuous records over a period of many years. It was obvious from our own experiences that many patients who left the hospital were eventually lost to us. By reference to the chart and table, one notices a progressive increase in negative responses as the years go by, the highest percentage of negatives in this unimproved group being 78.6 per cent at the end of 10 years. It is true that we followed the course of a small number of patients in the remission and improved group for the full 12-year period, but we did not figure out any percentages when there were less than ten patients available. In each instance we recorded the number of patients available for study at yearly intervals, but we felt that a statement of percentage in such small groups might not be convincing. We had to select some arbitrary minimum number from which to compute percentages. That number was 10.

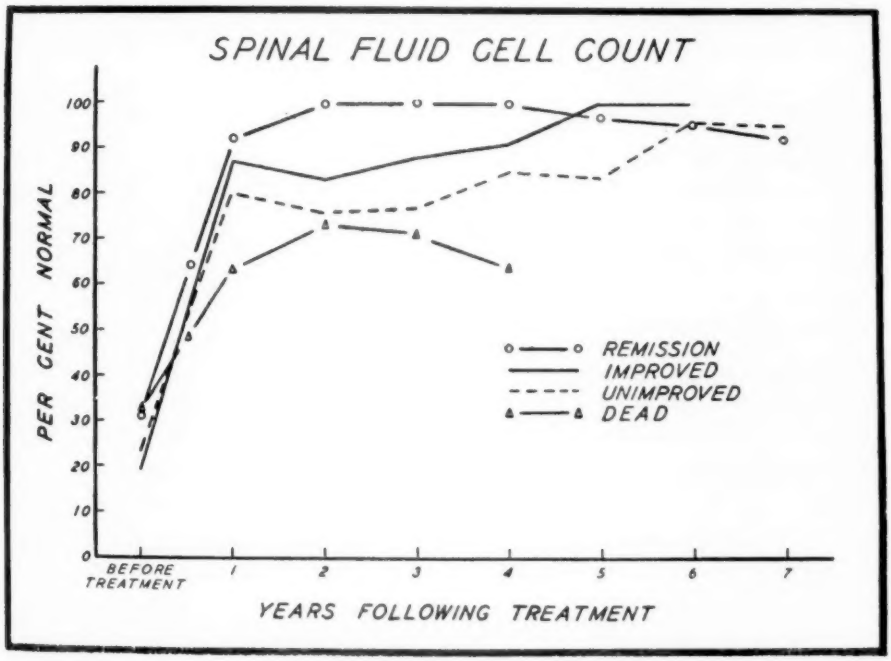

Chart III—Clinical Condition and Spinal Fluid Cell Count

Clinical condition and spinal fluid Wassermann reaction. (Chart II and Table 7.) The frequency of negative Wassermann reactions in the spinal fluid, prior to treatment, is appreciably less than the percentage of negative blood Wassermann reactions prior to treatment.

In each of the three groups (remission, improved, unimproved), there is a progressive increase in the frequency of negative spinal fluid Wassermann reactions with the passage of time. In the group of patients who gained a remission, the increase was from 1.3 per cent before treatment was started to 12.8 per cent at the end of the first year and to 84.2 per cent at the end of the sixth year. It is perhaps noteworthy to call attention to the fact that at the end of the sixth year the blood Wassermann reaction was negative in 57.8 per cent of the patients.

The percentage of negative reactions in those patients who improved was 5.4 per cent at the end of the first year; it was 17.1 per cent in the unimproved group and 2.6 per cent in the group that died. It seems therefore that comparative figures in the first year apparently carry no special significance. Comparative percentages of negative reactions at the end of the fourth year apparently show sufficient divergence to compel our attention. At the end of the fourth year the percentage of negative reactions in the remission group was 54.6, while in the improved group it was 27.8. It would appear, therefore, that among our own patients negative reactions at the end of a four-year period were twice as frequent in the remission than in the improved group. It is to be emphasized, however, that in the unimproved group, at the end of four years, the percentage of patients showing a negative response was 42.6. When the figures for the negative and the reduced spinal fluid Wassermann reactions are combined, the percentages at the end of the sixth year are very close to one another (See Chart II).

Attention is invited to the 100.0 per cent negative reactions in the unimproved group, comprising 10 patients, at the end of nine years.

The incidence of negative spinal fluid Wassermann reactions was consistently very low in the group that died. It would therefore appear from our figures that the prognosis is one of relatively

early fatality when the reactions are not favorably influenced. The spinal fluid Wassermann reaction appears to be a better prognostic guide than the blood Wassermann reaction.

Clinical condition and spinal fluid cell count. (Chart III and Table 8.) Among the patients who gained a remission the cell count of the spinal fluid progressed steadily and decisively to complete normality at the end of two years. In the remaining three groups the percentage of patients with normal cell counts at the end of two years was appreciably lower. With respect to cell count there is a very obvious diffrence in the four clinical groups. This is noteworthy, for example, at the end of four years. The percentage of patients with normal cell counts was 100.0 in the remission group, 91.2 in the improved group, 84.9 in the unimproved group, and 64.3 in the group that died.

Patients who remain unimproved exhibited a progressive decline in the cell count of the spinal fluid. Eventually all of the patients examined by us in this group had normal cell counts.

It appears that here too there may be a helpful prognostic guide. Many of the patients who maintained an abnormal cell count during the early years following therapy had a fatal outcome.

Clinical condition and spinal fluid globulin reaction. (Chart II and Table 9.) It was observed that during the early years following treatment, the percentage of patients showing a negative globulin reaction in the spinal fluid was consistently higher in the group of patients showing a remission than in the remaining three clinical groups. At the end of one year the percentages in the four groups were 39.2, 29.2, 21.9 and 9.7. The percentages occupied the same relative positions at the end of the fourth year. Beyond the fourth year, among those patients living, the percentage of patients showing a negative globulin reaction more nearly approximated one another.

In each of the four clinical groups it was obvious that the globulin reaction failed to become negative as frequently as the cell count did. The highest percentage of negative globulin reactions, among the group of patients examined by us, occurred in the unimproved group, in which it reached 81.0 per cent at the end of the

seventh year. The percentage of patients with a negative globulin reaction was relatively low in the group that died.

Clinical condition and gold sol reaction. (Chart II and Table 10.) Among the 315 patients examined by us a relatively low percentage had a negative gold sol reaction prior to the introduction of treatment. In the group that gained a remission the percentage of negatives was 2.6; in the improved group it was 1.2; in the unimproved, 2.2; and in those who died the percentage was 1.5.

At the end of the first year of treatment, the percentage of negative reactions, for each of the four clinical groups was 18.4 (remission), 15.5 (improved), 14.3 (unimproved) and zero (dead). Analagous figures at the end of three years were 31.3, 42.6, 19.7, and 28.6.

In each of the clinical groups there was a decided increase in the frequency of negative gold sol reactions with the passage of time. Among those patients who achieved a remission there was a rise in negative responses from 2.6 per cent to 89.4 per cent (at the end of the sixth year). The incidence of negativity in the unimproved group was not as high, though it progressed from 1.2 per cent to 45.4 per cent (at the end of the sixth year). These figures indicate that the percentage of gold sol reactions was approximately twice as high in the remission group as they were in the improved group (at the end of the sixth year). In Chart VI we have combined the percentages of low and negative gold sol curves. With this combination of percentages the figures for the three living groups more nearly approximate one another.

It is perhaps interesting to note that among the 12 unimproved patients the percentage of negative gold sold reactions is high, namely 75.0, at the end of 10 years.

2. *Serology in Individual Forms of Treatment.*

Under this heading we have arranged Tables 11, 12 and 13 to indicate the serological changes at stated intervals under individual methods of treatment. The first method to which we refer is malaria, and in this group we include only those who had received no treatment other than malaria. Because the malarial treated patients were the first to be treated by us, a much longer interval has

elapsed since treatment. The study comprised 117 patients who had received the malarial form of treatment.

The second method, the statistical results of which appear in Table 12, are those referable to patients who had had tryparsamide and mercury. They were not given any other form of treatment. For this study an original list of 68 patients was available.

The third method (Table 13) refers to patients who received fever therapy induced by an electrical apparatus. Many of these patients received tryparsamide and bismuth in addition to fever therapy. For present purposes we have considered all of these patients together. The results of fever treatment with and without chemotherapy are given elsewhere in this report.

Malaria (Table 11). For this study 117 patients were available. In the table they are divided into two large groups, those who showed clinical improvement and those who did not. Of the 68 patients who showed clinical improvement there was a much higher rate of improvement, from the standpoint of serological results, than there was among the 49 patients who showed no improvement under malarial treatment. At the end of two years following therapy, of 19 patients studied, the blood Wassermann reaction was negative in 10.5 per cent of the patients who showed clinical improvement, whereas there were no negative blood Wassermann reactions in those patients who did not show clinical improvement. Again, of the 15 patients who were regarded as clinically improved, and whose serology was known 12 years after the completion of malarial therapy, the blood Wassermann reaction was negative in 80.0 per cent of the patients, whereas among the 10 patients who did not show any clinical improvement the blood Wassermann reaction was negative in 40.0 per cent of the patients. Although there are some exceptions, the same general trend of improvement was observed with regard to the spinal fluid Wassermann reaction. In reference to cell count, globulin, and gold sol curve, the same general trend again held true, although the differences are not so marked.

Tryparsamide (Table 12). Of the 55 patients, receiving tryparsamide and examined at the end of one year following treatment,

28 of the patients were clinically improved, while 27 were unimproved. Considering these two groups it may be seen that, at the end of the year, the blood Wassermann reaction was negative in 32.2 per cent of the patients who improved and 29.6 per cent in those patients who failed to improve. At the end of a five-year period 11 patients were examined who were clinically improved and there were 15 patients who were unimproved. The percentages of negative blood Wassermann reaction in these two groups were 90.0 and 20.0 respectively. This means that there was a notably decided difference in the blood Wassermann reaction, at the end of a five-year period, in favor of the patients who improved. Essentially the same trend of differences was observed in the two groups from the standpoint of the spinal fluid Wassermann reaction and the gold sol curve.

It appears from a comparison of the data in Tables 11 and 12, that at a given period negative serological results are more frequently observed in patients treated by tryparsamide than in those treated by malaria. It has been our impression that patients treated with tryparsamide ordinarily do not show a progressive serological improvement as the years go by. The improvement is progressive during the first year or two of treatment; then there is a partial relapse from the standpoint of serology, which may last as long as three years, but which is again followed by progressive improvement.

Electropyrexia. This group includes patients who were given fever therapy by an ultrahigh frequency apparatus. Some of the patients were treated by fever alone, while others had tryparsamide in addition.

Of 73 patients, observed at the end of one year, the blood Wassermann reaction, among the clinically improved patients, was negative in 17.8 per cent of the patients, while it was negative in 14.0 per cent of the 43 patients who had not shown any clinical improvement. At the end of four years, the percentages were 59.1 of the improved group and 18.2 of the unimproved. Likewise, of the two clinical groups, from the standpoint of the spinal fluid Wassermann reaction and the gold sol curve, the percentages of negative responses were distinctly superior in the clinically improved group of patients. (Table 13.)

Serological results, observed under electropyrexial treatment, are superior to those seen in patients treated by malaria and by tryparsamide. We have comparable figures in each of the three treatment groups at the end of four years of observation. The percentages, referable to patients who gained clinical improvement are as follows:

Type of treatment	Number of patients	Negative blood Wassermann	Negative spinal fluid Wassermann	Negative gold sol
Malaria	14	28.6	57.2	57.2
Tryparsamide	11	36.4	41.7	45.5
Electropyrexia	22	59.1	63.6	77.3

C. Comparative Serology in Different Forms of Treatment

Charts IV and V and Tables 14 to 18 inclusive are made up of statistics showing serological results by years in the several forms of therapy.

Blood Wassermann Reaction. By reference to Chart IV and Table 14, it may be seen that the blood Wassermann reaction tended towards negativity under each of the forms of therapy to which attention is called in this communication. During the early months of tryparsamide therapy the blood Wassermann reaction became negative in a far greater proportion of patients than it did in those patients treated by other measures. For example, at the end of three months, 40 per cent of the patients treated by tryparsamide had a negative blood Wassermann reaction whereas the percentage was 16.1 with malaria, 9.4 with electropyrexia and chemotherapy and 6.4 with electropyrexia only. At the end of six months tryparsamide held the same superior position. For the next few years however there was a steady decline in the percentage of negative blood Wassermann reactions under tryparsamide therapy. There then followed a more or less progressive rise.

At the end of three years the percentage of negative blood Wassermann reactions in the group treated by electropyrexia and tryparsamide was 40.0, a figure that stood in strong contrast with 29.5 under malarial therapy, with 18.7 under electropyrexia alone, and with 16.2 under tryparsamide alone.

At the end of seven years the percentage of negative blood Wassermann reactions under malarial therapy was 68.4, while it was 58.3 in those patients who received tryparsamide only.

Serological results under electropyrexia alone were far less favorable than they were when chemotherapy was combined with electropyrexia. Furthermore, it appears that any single method of treatment failed to give as good results as a combination of fever and chemotherapy.

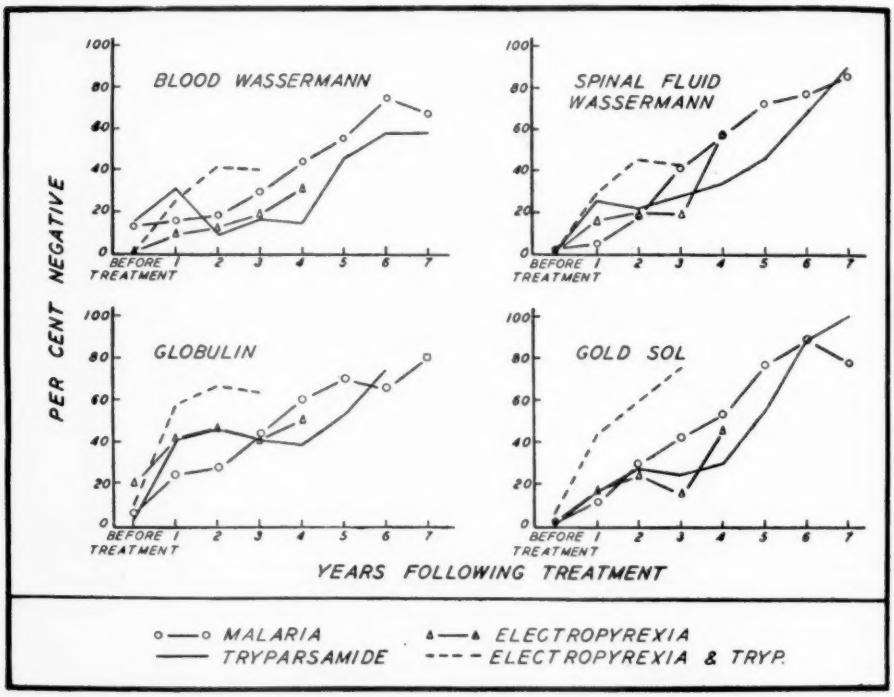

Chart IV—Serology and Type of Treatment

Spinal fluid Wassermann reaction. (Chart IV and Table 15.) Again it was observed that under modern forms of treatment the spinal fluid Wassermann reaction inclined in the direction of negativity. At the end of the first year the Wassermann reaction was negative in 28.9 per cent of the patients treated by electropyrexia and tryparsamide; the figure under tryparsamide therapy was 25.5; under electropyrexia only, it was 15.6; under malaria only, it

was 5.2. At the end of three years the percentages were 42.1, 27.8, 18.7, and 40.5 respectively.

It is interesting to note that after a period of seven years the percentage of negative spinal fluid Wassermann reaction was essentially the same, namely 85.7 and 90.0, under malarial treatment alone and tryparsamide treatment alone.

In most forms of therapy the spinal fluid Wassermann reaction was more favorably influenced than the blood Wassermann reaction.

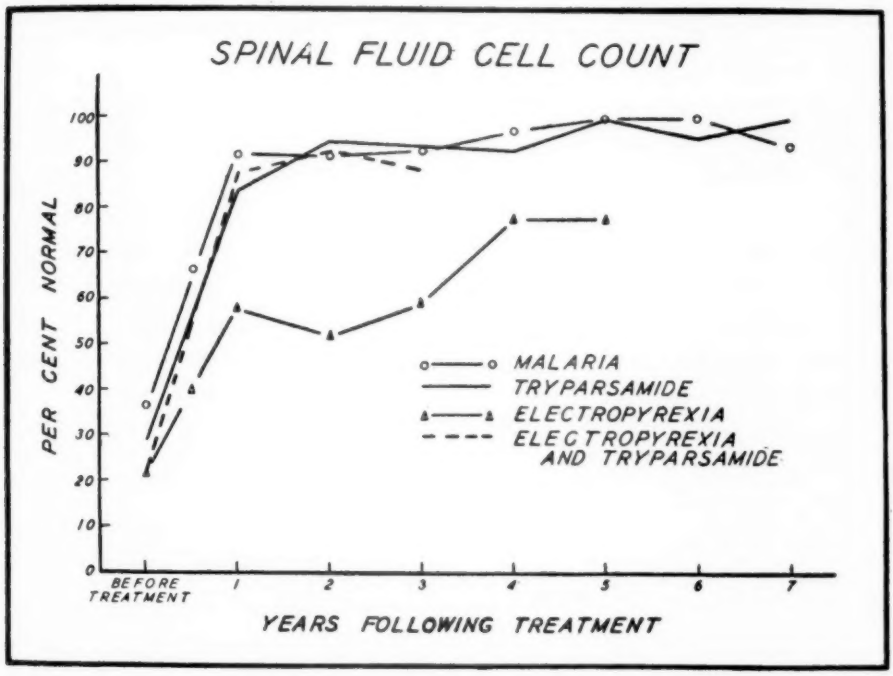

Chart V—Spinal Fluid Cell Count and Type of Therapy

Cell Count. (Chart V and Table 16.) Under each form of therapy reported herein, except that by electropyrexia alone, there was a rapid reduction of the cellular elements of the spinal fluid and the reduction was sustained throughout the period of observation. With electropyrexia alone there was a comparatively far smaller percentage of patients with normal cell counts in the spinal fluid.

Globulin Reaction. (Chart IV and Table 17). Under each

method of therapy, the globulin reaction of the spinal fluid tended toward negativity. At the end of one year, the percentage of negative globulin reactions was highest (56.5) among those patients treated by electropyrexia and tryparsamide; it was second highest (42.0) in those treated by electropyrexia only; third highest in patients treated by tryparsamide only; and fourth (24.4) in those treated by malaria only. At the end of three years electropyrexia and tryparsamide combined still had the superior percentage (63.1), while the remaining three forms of treatment had approximately the same percentage of negative globulin reaction, namely about 41.0 per cent.

Gold Sol Curve. (Chart IV and Table 18.) It is evident that among our patients, the gold sol curve was favorably influenced in all the forms of treatment employed. Again the best results were observed when electropyrexia and tryparsamide combined were used. At the end of one year the percentage of negative gold sol reactions was highest (42.5) in patients treated with electropyrexia and tryparsamide; it was next highest (16.5) in those treated by electropyrexia only; it was third highest (15.7) among those treated by tryparsamide only; and fourth (11.2) among those treated by malaria only. The comparable figures at the end of three years were 75.0, 15.4, 24.3, and 42.1, respectively.

Summary

It is a finding, common to almost all investigators, that there is a decisive improvement in the serological reactions of the great majority of patients, apart from the particular method of therapy employed. The earliest serological changes occur in the cell count of the spinal fluid. Many feel that the reduction of the cell count is a reflection of a reduction of the intensity of the pathological neurological process. The globulin content of the spinal fluid also undergoes diminution, which, however, is slowly accomplished and ordinarily is not as frequently negative as the cell count is. Blood and spinal fluid Wassermann reactions likewise tend to become negative; the majority of reactions, however, do not gain a negative state under four or five years following treatment. In general, the Wassermann reaction of the spinal fluid becomes negative be-

fore that of the blood. The gold sol curve is usually the last serological reaction to be favorably influenced and very often there is a reduction in the height of the curve rather than a return to negative.

Common also to many investigators, is the finding that serological improvement is in general independent of the clinical condition of the patient. In the early years after therapy, studies on serology do not lend themselves very accurately to prognostic considerations. However, a persistently positive serological ensemble is usually associated with an unfavorable clinical condition.

It appears that the clinical and serological outcomes are approximately the same in patients treated by febrifacient agents or by chemotherapy. The arsenical preparation of choice is undoubtedly that belonging to the pentavalent series. It seems, also, that the preferable therapeutic method includes pyretotherapy and chemotherapy.

From the study of our own patients, we are in general agreement with the prevailing opinions of others. Our own observations cover a range of 12 years and lead to the following summary:

1. Ten years after treatment, 75.0 per cent of 28 patients had a negative blood Wassermann reaction; 89.3 per cent of 28 patients had a negative spinal fluid Wassermann reaction; 100.0 per cent of 26 patients had a normal cell count in the spinal fluid; 75.0 per cent of 24 patients had a negative globulin reaction; and 73.1 per cent of 26 patients had negative gold sol curves.

2. Those patients who gained a clinical remission showed a higher percentage of negative serological reactions than the patients in other clinical categories. We do not believe that serological information may be unqualifiedly used in the prognosis of individual patients; it is valuable principally for comparing results in groups of patients. In our own experience, perhaps the safest time, if there is any, to estimate the future course of the patient's condition, from the standpoint of serology, is three or four years after treatment has been started.

3. With our group of 326 patients, the most favorable clinical and serological results were observed in those patients who received fever therapy, followed by chemotherapy.

TABLE 1. BLOOD WASSERMANN REACTION

Time relation to therapy	Percentage of patients								
	Males			Females			All patients		
	Strongly positive	Weakly positive	Negative	Strongly positive	Weakly positive	Negative	Strongly positive	Weakly positive	Negative
Before	75.8	14.8	9.4	85.3	9.1	5.0	78.9	13.0	8.1
After	63.9	13.5	17.0	73.7	11.1	15.2	70.8	12.7	16.5
¼ year	58.3	25.0	16.7	73.1	6.5	20.4	63.0	19.2	17.8
½ year	57.4	24.7	17.9	68.1	16.5	15.4	60.8	22.1	17.1
1 year	54.1	29.5	16.4	61.8	23.6	14.6	56.6	27.6	15.8
2 years	48.4	31.4	20.2	66.2	23.5	10.3	53.8	29.0	17.2
3 years	40.6	30.5	28.9	60.0	24.0	16.0	46.1	28.7	25.3
4 years	38.1	25.8	36.1	44.2	30.2	25.6	40.0	27.1	32.9
5 years	30.7	29.0	40.3	23.5	29.4	47.1	28.1	29.2	42.7
6 years	18.2	31.8	50.0	4.8	23.8	71.4	13.9	29.2	56.9
7 years	14.8	44.4	40.8	7.1	28.6	64.3	12.2	39.0	48.8
8 years	7.6	46.2	46.2	....	....	....	9.5	42.9	47.6
9 years	14.3	28.6	57.1	....	....	....	15.0	25.0	60.0
10 years	5.9	17.6	76.5	0.0	27.3	72.7	3.6	21.4	75.0
11 years	10.5	31.6	57.9	....	....	....	8.0	24.0	68.0
12 years	8.3	41.7	50.0	....	....	....	5.3	31.6	63.1

	Number of Patients		
Before	223	99	322
After	223	99	322
¼ year	204	93	297
½ year	190	91	281
1 year	183	89	272
2 years	153	68	221
3 years	128	50	178
4 years	97	43	140
5 years	62	34	96
6 years	44	21	65
7 years	27	14	41
8 years	13	8	21
9 years	14	6	20
10 years	17	11	28
11 years	19	6	25
12 years	12	7	19

TABLE 2. SPINAL FLUID WASSERMANN REACTION

Time relation to therapy	Percentage of patients: Males Strongly positive	Males Weakly positive	Males Negative	Females Strongly positive	Females Weakly positive	Females Negative	All patients Strongly positive	All patients Weakly positive	All patients Negative
Before	89.1	9.9	1.0	90.0	10.0	0.0	89.4	10.0	0.6
After	73.3	23.5	3.2	72.0	22.0	6.0	72.9	23.1	4.0
¼ year	59.5	36.1	4.4	60.0	27.4	12.6	59.7	33.3	7.0
½ year	51.1	41.1	7.8	53.3	36.7	10.0	51.8	39.6	8.6
1 year	42.9	45.7	11.4	49.4	41.6	9.0	45.1	44.3	10.6
2 years	32.4	44.4	23.2	41.8	43.3	14.9	35.3	34.0	20.7
3 years	28.4	41.7	29.9	43.7	42.9	22.4	30.1	42.1	27.8
4 years	20.8	38.6	40.6	23.8	42.9	33.3	21.7	39.9	38.4
5 years	14.5	38.7	46.8	13.9	33.3	52.8	14.3	36.7	49.0
6 years	6.8	25.0	68.2	0.0	27.3	72.7	4.5	25.8	69.7
7 years	4.0	12.0	84.0	7.7	7.7	84.6	5.3	10.5	84.2
8 years	15.4	7.7	76.9	....	....	....	15.8	10.5	73.7
9 years	0.0	14.3	85.7	....	....	....	5.0	10.0	85.0
10 years	0.0	11.8	88.2	9.1	0.0	90.9	3.6	7.1	89.3
11 years	5.3	10.5	84.2	....	....	....	4.0	8.0	88.0
12 years	8.3	0.0	91.7	....	....	....	5.3	0.0	94.7

	Number of Patients: Males	Females	All patients
Before	221	100	321
After	221	100	321
¼ year	205	95	300
½ year	190	90	280
1 year	184	89	273
2 years	151	67	218
3 years	127	49	176
4 years	96	42	138
5 years	62	36	98
6 years	44	22	66
7 years	25	13	38
8 years	13	6	19
9 years	14	6	20
10 years	17	11	28
11 years	19	6	25
12 years	12	7	19

TABLE 3. SPINAL FLUID CELL COUNT

Time relation to therapy	Percentage of patients					
	Males		Females		All patients	
	Increased cell count	Normal cell count	Increased cell count	Normal cell count	Increased cell count	Normal cell count
Before	74.4	25.6	73.0	27.0	74.0	26.0
After	28.7	71.3	19.0	81.0	25.7	74.3
¼ year	18.0	82.0	9.7	90.3	15.4	84.6
½ year	18.7	81.3	11.2	88.8	16.4	83.6
1 year	21.0	79.0	8.4	91.6	17.1	82.9
2 years	17.8	82.2	10.6	89.4	15.6	84.4
3 years	15.6	84.4	10.9	89.1	14.4	85.6
4 years	12.8	87.2	9.8	90.2	11.9	88.1
5 years	6.3	93.7	14.3	85.7	9.2	90.8
6 years	4.8	95.2	0.0	100.0	3.1	96.9
7 years	12.0	88.0	0.0	100.0	8.1	91.9
8 years	7.1	92.9	....	....	5.3	94.7
9 years	7.1	92.9	....	....	5.3	94.7
10 years	0.0	100.0	0.0	100.0	0.0	100.0
11 years	0.0	100.0	....	....	0.0	100.0
12 years	8.3	91.7	....	....	5.3	94.7

	Number of Patients		
Before	223	100	323
After	223	100	323
¼ year	205	93	298
½ year	192	89	281
1 year	186	83	269
2 years	152	66	218
3 years	135	46	181
4 years	94	41	135
5 years	63	35	98
6 years	42	22	64
7 years	25	12	37
8 years	14	5	19
9 years	14	5	19
10 years	16	10	26
11 years	17	6	23
12 years	12	7	19

TABLE 4. SPINAL FLUID GLOBULIN REACTION

Time relation to therapy	Percentage of patients: Males			Females			All patients		
	Over 1 plus	1 plus	Negative	Over 1 plus	1 plus	Negative	Over 1 plus	1 plus	Negative
Before	68.1	28.8	3.1	68.7	24.2	7.1	68.3	27.4	4.3
After	46.5	42.0	11.5	43.5	35.3	21.2	45.6	40.0	14.4
¼ year	31.4	53.9	14.7	39.8	31.2	29.0	34.0	46.8	19.2
½ year	29.8	48.4	21.8	31.8	44.4	23.9	30.4	47.1	22.5
1 year	27.8	49.2	23.0	26.4	37.9	35.7	27.4	45.6	27.0
2 years	27.0	36.5	36.5	28.1	42.2	29.7	27.3	38.2	34.5
3 years	20.8	37.6	41.6	29.6	31.8	38.6	23.1	36.1	40.8
4 years	11.6	47.4	41.0	26.2	26.2	47.6	16.1	40.9	43.0
5 years	17.4	28.6	54.0	23.5	17.7	58.8	19.5	24.8	55.7
6 years	5.0	25.0	70.0	5.0	25.0	70.0	5.0	25.0	70.0
7 years	0.0	25.9	74.1	0.0	23.1	76.9	0.0	25.0	75.0
8 years	0.0	30.0	70.0	0.0	16.7	83.3	0.0	25.0	75.0
9 years	15.4	23.1	61.5	0.0	14.3	85.7	10.0	20.0	70.0
10 years	21.4	14.3	64.3	0.0	10.0	90.0	12.5	12.5	75.0
11 years	16.6	27.8	55.6	0.0	14.3	85.7	12.5	20.8	66.7
12 years	7.7	38.5	53.8	0.0	....	....	5.0	30.0	65.0

	Number of Patients		
Before	226	99	325
After	226	99	325
¼ year	204	93	297
½ year	188	88	276
1 year	187	87	274
2 years	156	64	220
3 years	125	44	169
4 years	95	42	137
5 years	63	34	97
6 years	40	20	60
7 years	27	13	40
8 years	10	6	16
9 years	13	7	20
10 years	14	10	24
11 years	18	6	24
12 years	13	7	20

TABLE 5. GOLD SOL CURVES

Time relation to therapy	Percentage of patients: Males			Females			All patients		
	High and medium	Low	Negative	High and medium	Low	Negative	High and medium	Low	Negative
Before	89.2	9.0	1.8	93.5	4.3	2.2	90.5	6.5	3.0
After	81.5	14.4	4.1	89.2	6.5	4.3	83.8	12.1	4.1
¼ year	74.0	19.1	6.9	86.9	9.5	3.6	77.8	16.3	5.9
½ year	69.3	23.3	7.4	79.5	14.5	6.0	72.4	20.6	7.0
1 year	62.1	23.1	14.8	67.5	20.5	12.0	63.7	22.2	14.0
2 years	48.3	24.2	27.5	66.1	17.8	16.1	53.6	22.3	24.1
3 years	43.9	21.0	35.1	57.1	26.2	16.7	47.3	22.4	30.3
4 years	42.2	22.2	35.6	55.2	15.8	29.0	46.1	20.3	33.6
5 years	27.1	15.3	57.6	36.4	18.2	45.4	30.5	16.3	53.2
6 years	12.2	14.6	73.2	11.8	17.6	70.6	12.1	15.5	72.4
7 years	19.2	15.4	65.4	18.2	9.1	72.7	18.9	13.5	67.6
8 years	15.4	7.7	76.9	20.0	0.0	80.0	16.7	5.6	77.7
9 years	30.8	0.0	69.2	....	....	....	23.5	0.0	76.5
10 years	17.7	11.8	70.5	....	....	....	11.5	15.4	73.1
11 years	10.6	15.8	73.6	....	....	....	7.6	19.3	73.1
12 years	0.0	16.7	83.3	....	....	....	0.0	16.7	83.3

	Number of Patients		
Before	222	93	315
After	222	93	315
¼ year	204	84	288
½ year	189	83	272
1 year	182	83	265
2 years	149	62	211
3 years	123	42	165
4 years	90	38	128
5 years	59	33	92
6 years	41	17	58
7 years	26	11	37
8 years	13	5	18
9 years	13	4	17
10 years	17	9	26
11 years	19	7	26
12 years	12	6	18

TABLE 6. CLINICAL CONDITION AND BLOOD WASSERMANN REACTION

Time relation to therapy	Percentage of negative reactions							
	Remission		Improved		Unimproved		Dead	
	Reduced	Negative	Reduced	Negative	Reduced	Negative	Reduced	Negative
Before	....	12.2	....	6.4	....	3.2	....	11.9
After	18.3	20.7	12.8	10.3	11.6	13.7	7.5	22.4
¼ year	24.4	26.9	20.3	14.8	17.2	10.4	13.8	20.7
½ year	27.8	24.1	22.5	12.7	20.2	14.3	14.9	17.0
1 year	31.3	21.2	34.3	12.8	20.5	14.4	23.1	12.8
2 years	28.3	21.7	46.8	16.1	21.3	16.0	8.3	12.5
3 years	26.0	30.0	34.7	36.7	25.8	15.1	30.8	15.4
4 years	26.4	34.2	34.2	39.5	25.9	25.9	10.0	30.0
5 years	32.3	41.9	22.7	50.0	30.6	38.8	....	....
6 years	21.1	57.8	20.0	53.3	42.8	53.6	....	....
7 years	25.0	50.0	....	....	45.5	50.0	....	....
8 years	....	....	....	....	41.7	50.0	....	....
9 years	....	....	....	....	20.0	70.0	....	....
10 years	....	....	....	....	21.4	78.6	....	....
11 years	....	....	....	....	33.3	58.4	....	....
12 years	....	....	....	....	27.3	63.6	....	....

	Number of Patients			
Before	..	..	..	..
After	82	78	95	67
¼ year	78	74	87	58
½ year	79	71	84	47
1 year	80	70	83	39
2 years	60	62	75	24
3 years	50	49	66	13
4 years	38	38	54	10
5 years	31	22	36	7
6 years	19	15	28	3
7 years	12	7	22	0
8 years	6	3	12	0
9 years	6	4	10	0
10 years	8	6	14	0
11 years	7	6	12	0
12 years	5	3	11	0

TABLE 7. CLINICAL CONDITION AND SPINAL FLUID WASSERMANN REACTION

Time relation to therapy	Percentage of negative reactions							
	Remission		Improved		Unimproved		Dead	
	Reduced	Negative	Reduced	Negative	Reduced	Negative	Reduced	Negative
Before	....	1.3	....	0.0	....	1.1	....	0.0
After	26.2	7.5	28.8	0.0	20.8	6.3	15.4	1.5
¼ year	35.4	10.1	44.8	2.6	26.7	11.1	25.5	1.8
½ year	44.9	12.8	50.0	2.7	31.7	13.4	28.3	2.1
1 year	51.3	12.8	56.8	5.4	34.1	17.1	28.2	2.6
2 years	52.5	29.5	54.2	18.7	44.6	16.9	20.0	8.0
3 years	50.0	34.6	44.7	34.0	40.0	23.3	17.6	5.9
4 years	37.8	54.6	52.8	27.8	35.2	42.6	27.3	0.0
5 years	26.7	70.0	47.6	28.6	40.0	50.0	....	....
6 years	5.3	84.2	35.3	58.8	30.8	69.2	....	....
7 years	8.3	83.4	....	....	10.0	85.0	....	....
8 years	....	....	....	....	10.0	90.0	....	....
9 years	....	....	....	....	0.0	100.0	....	....
10 years	....	....	....	....	7.1	92.9	....	....
11 years	....	....	....	....	8.3	83.4	....	....
12 years	....	....	....	....	9.1	90.9	....	....

	Number of Patients			
Before	80	80	96	65
After	80	80	96	65
¼ year	79	76	90	55
½ year	78	74	82	46
1 year	78	74	82	39
2 years	61	59	83	25
3 years	52	47	60	17
4 years	37	36	54	11
5 years	30	21	40	7
6 years	19	17	26	4
7 years	12	6	20	0
8 years	4	4	10	1
9 years	5	5	10	0
10 years	7	7	14	0
11 years	7	6	12	0
12 years	4	4	11	0

TABLE 8. CLINICAL CONDITION AND SPINAL FLUID CELL COUNT

Time relation to therapy	Percentage of patients with normal cell count			
	Remission	Improved	Unimproved	Dead
Before	30.5	19.2	22.9	32.8
After	90.2	70.5	70.8	64.2
¼ year	97.5	85.3	83.3	67.2
½ year	98.7	79.7	84.0	64.6
1 year	92.3	87.3	80.0	62.5
2 years	100.0	83.3	76.4	73.1
3 years	100.0	87.7	77.1	70.6
4 years	100.0	91.2	84.9	64.3
5 years	96.8	100.0	84.2	....
6 years	95.0	100.0	95.8	....
7 years	91.7	....	94.7	....
8 years	....	....	90.9	....
9 years	....	....	....	....
10 years	....	....	100.0	....
11 years	....	....	100.0	....
12 years	....	....	100.0	....
	Number of Patients			
Before	82	78	96	67
After	82	78	96	67
¼ year	81	75	84	58
½ year	78	74	81	48
1 year	78	71	80	40
2 years	60	60	72	20
3 years	46	57	61	17
4 years	34	34	53	14
5 years	31	20	38	9
6 years	20	15	24	5
7 years	12	6	19	0
8 years	5	2	11	1
9 years	6	4	9	0
10 years	8	5	13	0
11 years	8	5	10	0
12 years	5	4	10	0

TABLE 9. CLINICAL CONDITION AND SPINAL FLUID GLOBULIN REACTION

Time relation to therapy	Percentage of patients with negative globulin reaction			
	Remission	Improved	Unimproved	Dead
Before	6.2	2.5	5.3	2.9
After	18.5	11.0	15.9	11.7
¼ year	27.8	17.3	17.7	12.1
½ year	35.5	20.6	21.0	6.5
1 year	39.2	29.2	21.9	9.7
2 years	54.0	36.7	22.5	15.4
3 years	68.1	36.2	26.2	28.6
4 years	61.1	46.0	32.1	27.2
5 years	77.5	45.0	50.0	....
6 years	61.1	66.7	80.0	....
7 years	69.2	....	81.0	....
8 years	....	....	80.0	....
9 years	....	....	72.7	....
10 years	....	....	76.9	....
11 years	....	....	70.0	....
12 years	....	....	75.0	....
	Number of Patients			
Before	81	82	94	68
After	81	82	94	68
¼ year	79	75	85	58
½ year	76	73	81	46
1 year	79	72	82	41
2 years	63	60	71	26
3 years	47	47	61	14
4 years	36	37	53	11
5 years	31	21	38	8
6 years	18	15	25	2
7 years	13	6	21	0
8 years	4	4	10	0
9 years	5	4	11	0
10 years	7	4	13	0
11 years	7	7	10	0
12 years	4	4	12	0

TABLE 10. CLINICAL CONDITION AND LOW OR NEGATIVE GOLD SOL REACTION

Time relation to therapy	Percentage of patients							
	Remission		Improved		Unimproved		Dead	
	Low	Negative	Low	Negative	Low	Negative	Low	Negative
Before	11.5	2.6	9.0	1.2	8.5	2.2	0.0	1.5
After	14.1	7.7	9.0	5.1	10.6	3.2	15.4	0.0
¼ year	20.8	6.5	12.3	6.9	15.7	2.4	16.4	9.1
½ year	21.1	10.5	25.3	9.9	19.8	4.9	13.6	0.0
1 year	21.0	18.4	25.4	15.5	22.6	14.3	17.6	0.0
2 years	25.8	30.6	25.0	30.4	21.4	17.1	8.7	13.0
3 years	33.3	31.3	17.0	42.6	23.2	19.7	0.0	28.6
4 years	20.6	52.5	53.3	36.4	15.7	21.6	....	....
5 years	13.8	75.9	26.3	31.6	15.8	47.4	....	....
6 years	5.3	89.4	36.4	45.4	16.0	72.0	....	....
7 years	7.7	76.9	....	....	15.8	63.2	....	....
8 years	....	....	....	....	0.0	80.0	....	....
9 years	....	....	....	....	....	....	....	....
10 years	....	....	....	....	8.3	75.0	....	....
11 years	....	....	....	....	7.7	84.6	....	....
12 years	....	....	....	....	20.0	80.0	....	....

	Number of Patients			
Before	78	78	94	65
After	78	78	94	65
¼ year	77	73	83	55
½ year	76	71	81	44
1 year	76	71	84	34
2 years	62	56	70	23
3 years	48	47	56	14
4 years	34	33	51	9
5 years	29	19	38	4
6 years	19	11	25	3
7 years	13	5	19	0
8 years	55	2	10	1
9 years	5	4	8	0
10 years	8	6	12	0
11 years	7	6	13	0
12 years	4	4	10	0

TABLE 11. PERCENTAGE OF PATIENTS WITH NEGATIVE SEROLOGY BY YEARS
A. MALARIAL TREATMENT

Years since malaria	Number of patients	Blood Wassermann	Spinal fluid Wassermann	Cells	Globulin	Gold sol
Clinically Improved Patients						
1-2	19	10.5	5.3	100.0	42.1	15.8
2-4	14	28.6	57.2	100.0	42.9	57.2
4-7	20	55.0	95.0	95.0	75.0	75.0
7-12	15	80.0	100.0	86.7	73.3	73.3
Clinically Unimproved Patients						
1-2	12	0.0	8.3	66.7	8.3	8.3
2-4	13	23.1	23.1	69.2	38.4	30.8
4-7	14	35.7	57.2	85.7	42.8	50.0
7-12	10	40.0	70.0	100.0	70.0	90.0

TABLE 12. PERCENTAGE OF PATIENTS WITH NEGATIVE SEROLOGY BY YEARS
B. TRYPARSAMIDE

Years since tryparsamide	Number of patients	Blood Wassermann	Spinal fluid Wassermann	Gold sol
Clinically Improved Patients				
1	28	32.2	28.6	21.4
2	20	10.0	26.3	33.3
3	12	25.0	33.3	36.4
4	11	36.4	41.7	45.5
5	11	90.9	81.8	90.0
Clinically Unimproved Patients				
1	27	29.6	18.5	10.7
2	23	4.4	13.0	37.5
3	20	20.0	15.0	30.0
4	17	11.8	18.8	16.7
5	15	20.0	33.3	40.0

TABLE 13. PERCENTAGE OF PATENTS WITH NEGATIVE SEROLOGY BY YEARS C. ELECTROPYREXIA ALONE AND WITH CHEMOTHERAPY

Years since treatment	Number of patients	Blood Wassermann	Spinal fluid Wassermann	Gold sol
Clinically Improved Patients				
1	73	17.8	19.2	34.2
2	48	31.3	41.6	54.0
3	38	47.4	47.4	63.2
4	22	59.1	63.6	77.3
Clinically Unimproved Patients				
1	43	14.0	11.6	11.6
2	37	8.1	18.9	24.3
3	33	18.2	30.3	33.3
4	22	18.2	40.9	40.9

TABLE 14. BLOOD WASSERMANN REACTION IN RELATION TO TYPE OF THERAPY

Time relation to therapy	Percentage of patients							
	Malaria only		Tryparsamide only		Electropyrexia only		Electropyrexia and tryparsamide	
	Reduced	Negative	Reduced	Negative	Reduced	Negative	Reduced	Negative
Before	....	12.7	....	14.5	....	0.0	....	0.0
After	9.3	14.0	12.9	41.9	4.7	4.6	1.8	8.9
¼ year	13.6	16.1	11.7	40.0	0.0	6.4	5.7	9.4
½ year	16.8	15.9	12.5	41.1	1.5	4.5	2.0	14.3
1 year	16.9	15.7	21.1	30.8	0.0	9.1	2.3	25.0
2 years	22.6	17.7	40.9	9.1	4.0	12.0	5.9	41.2
3 years	29.5	29.5	43.2	16.2	6.3	18.7	0.0	40.0
4 years	16.7	44.4	50.0	15.4	7.7	30.8	....	....
5 years	17.2	55.2	36.4	45.4	....	....	....	....
6 years	12.5	75.0	36.8	57.9	....	....	....	....
7 years	21.1	68.4	33.3	58.3	....	....	....	....
Number of Patients								
Before	150		62		86		56	
After	150		62		86		56	
¼ year	118		60		78		53	
½ year	107		56		66		49	
1 year	89		52		44		44	
2 years	62		44		25		34	
3 years	44		37		16		15	
4 years	36		26		13		..	
5 years	29		22		..		..	
6 years	24		19		..		..	
7 years	19		12		..		..	

TABLE 15. SPINAL FLUID WASSERMANN REACTION IN RELATION TO TYPE OF THERAPY

Time relation to therapy	Percentage of patients							
	Malaria only		Tryparsamide only		Electropyrexia only		Electropyrexia and tryparsamide	
	Reduced	Negative	Reduced	Negative	Reduced	Negative	Reduced	Negative
Before	....	1.6	....	0.0	....	0.0	....	0.0
After	19.0	1.6	30.6	11.3	3.5	3.5	10.7	3.6
¼ year	26.5	3.3	27.9	21.3	1.3	10.2	7.6	7.5
½ year	30.6	4.6	38.3	20.0	4.6	12.3	8.2	10.2
1 year	47.4	5.2	39.2	25.5	0.0	15.6	2.2	28.9
2 years	44.4	17.5	35.6	22.2	4.0	20.0	6.9	44.8
3 years	35.7	40.5	38.9	27.8	6.3	18.7	5.3	42.1
4 years	32.4	56.8	34.4	34.4	16.7	58.3	....	....
5 years	13.5	73.0	34.6	46.2	....	....	....	....
6 years	20.0	76.7	22.7	68.2	....	....	....	....
7 years	9.5	85.7	0.0	90.0	....	....	....	....

	Number of Patients			
Before	153	62	86	56
After	153	62	86	56
¼ year	121	61	78	53
½ year	108	60	65	49
1 year	97	51	45	45
2 years	63	45	25	29
3 years	42	36	16	19
4 years	37	32	12	..
5 years	37	26	..	..
6 years	30	22	..	..
7 years	21	10	..	..

TABLE 16. NORMAL SPINAL FLUID CELL COUNT IN RELATION TO TYPE OF THERAPY

Times relation to therapy	Percentage of normal cell counts			
	Malaria only	Tryparsamide only	Electropyrexia only	Electropyrexia and tryparsamide
Before	37.3	29.0	22.1	21.6
After	76.7	....	64.0	84.3
¼ year	93.2	85.5	66.7	87.7
½ year	92.2	89.7	58.3	95.5
1 year	92.3	83.7	58.3	88.4
2 years	91.8	95.1	52.0	92.9
3 years	92.5	93.9	58.8	88.9
4 years	97.2	93.1	77.8	....
5 years	100.0	100.0	77.8	....
6 years	100.0	95.5	....	....
7 years	94.1	100.0	....	....

	Number of Patients			
Before	150	62	86	51
After	150	..	86	51
¼ year	118	62	66	49
½ year	102	58	60	44
1 year	91	49	48	43
2 years	61	41	25	28
3 years	40	33	17	18
4 years	36	29	9	..
5 years	29	25	9	..
6 years	28	22	..	..
7 years	17	11	..	..

TABLE 17. SPINAL FLUID GLOBULIN REACTION IN RELATION TO TYPE OF THERAPY

Time relation to therapy	Percentage of patients							
	Malaria only		Tryparsamide only		Electropyrexia only		Electropyrexia and tryparsamide	
	1 plus	Negative	1 plus	Negative	1 plus	Negative	1 plus	Negative
Before	17.6	5.9	22.2	1.6	43.7	19.5	35.1	9.3
After	19.6	10.5	....	....	64.3	25.3	62.9	20.4
¼ year	25.0	20.8	32.8	32.8	54.6	26.7	49.0	43.1
½ year	35.0	19.6	47.1	30.2	46.8	30.6	43.7	54.2
1 year	33.3	24.4	43.3	39.6	42.0	42.0	41.3	56.5
2 years	41.2	27.4	34.1	45.5	34.8	47.4	31.0	65.5
3 years	27.5	42.5	22.9	40.0	41.2	41.2	31.6	63.1
4 years	21.6	59.5	27.6	37.9	50.0	50.0	....	....
5 years	13.3	70.0	17.4	52.2	....	....	....	....
6 years	26.1	65.2	21.7	73.9	....	....	....	....
7 years	20.0	80.0	....	....	....	....	....	....

	Number of Patients			
Before	153	63	87	54
After	153	..	..	54
¼ year	120	61	75	51
½ year	97	53	62	48
1 year	90	53	50	46
2 years	51	44	23	29
3 years	40	35	17	19
4 years	37	29	12	..
5 years	30	23	..	..
6 years	23	23	..	..
7 years	15	10	..	..

TABLE 18. GOLD SOL REACTION IN RELATION TO TYPE OF THERAPY

Time relation to therapy	Percentage of patients							
	Malaria only		Tryparsamide only		Electropyrexia only		Electropyrexia and tryparsamide	
	Low	Negative	Low	Negative	Low	Negative	Low	Negative
Before	2.9	0.0	3.3	0.0	32.5	2.5	21.8	3.6
After	9.4	1.5	....	....	30.1	10.9	32.8	9.1
¼ year	9.8	5.9	11.9	1.7	35.4	12.9	48.0	12.0
½ year	11.4	9.1	9.3	7.4	39.5	15.1	46.7	8.9
1 year	13.8	11.2	9.8	15.7	28.5	16.5	35.0	42.5
2 years	8.6	29.3	24.4	26.8	14.3	23.8	22.2	59.3
3 years	15.8	42.1	21.2	24.3	15.4	15.4	20.0	75.0
4 years	19.4	52.8	17.9	28.6	9.1	45.5	....	....
5 years	9.7	77.4	10.0	55.0	....	....	....	....
6 years	3.6	89.3	5.9	88.2	....	....	....	....
7 years	5.6	77.8	0.0	100.0	....	....	....	....

	Number of Patients			
Before	138	60	83	55
After	138	..	83	55
¼ year	102	59	79	50
½ year	88	54	66	45
1 year	80	51	49	40
2 years	58	41	21	27
3 years	38	33	13	20
4 years	36	28	11	..
5 years	31	20	..	..
6 years	28	17	..	..
7 years	18	10	..	..

INTRAVENTRICULAR MENINGIOMAS

(*Choroidal Fibroblastomas**)

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Descriptions of intraventricular meningiomas are rarely encountered in medical literature. A growing recognition of this type of lesion has, however, been apparent in recent years, during which time a small number of these neoplasms has been observed at the operating and postmortem tables. The authors of this article wish to call attention to this unusual site for meningeal tumors and to record an instance of such a lesion encountered in their own experience.**

Among the earliest of the recorded cases was that reported by Hosoi[1] in 1930. This observer described a psammomatous meningioma occupying the body and posterior horn of the right lateral ventricle. This neoplasm was found to be in close relationship to the choroid plexus. In addition the particular brain showed multiple dural nodules and multiple angiomas of the cerebral cortex. The histological picture of the former lesions was similar to that of the intraventricular tumor. The patient in this instance was a 34-year-old woman who suffered from episodic depressions, dizzy spells and "pressure" in the head for three years. The neurologic status, apart from the mental condition, was normal. The disclosure of the tumor was an accidental finding at necropsy. Death had followed 24 hours after a cholecystectomy.

Bailey and Bucy[2] in 1931 recorded the removal of a left occipital meningioma of the fibroblastic type in a girl of 14. The tumor was "followed inward to a depth of about 5 cm., when the lateral ventricle was entered. It was then apparent that the tumor formed a part of the lateral wall of the ventricle and that the choroid plexus

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**We are indebted to the late Dr. C. Floyd Haviland, former superintendent of the Manhattan State Hospital, for permission to use the material of the case herein reported.

†Since this study was undertaken, Dr. Bailey, at a meeting of the American Association of Neuropathologists (June 5, 1937) saw fit to remove this neoplasm from the group of intraventricular meningiomas, noting that subsequent study showed the tumor to be derived from the convexity leptomeninx.

was adherent to its surface."† This patient had suffered from headaches for three years, amblyopia for one year and vomiting for three weeks at the time she sought surgical relief. Examination disclosed amaurosis of the left eye, retention of light perception in the right eye and two diopters of papilledema. X-ray of the skull showed a thickening of the inner table in the left parieto-occipital region. Ventriculography disclosed "a displacement of the left lateral ventricle downward and forward and a shift of both ventricles toward the right." This patient was materially benefited following complete removal of the tumor at a secondary craniotomy.

Roscher[3] in 1933 described a case of meningioma of the right lateral ventricle occupying chiefly the occipital horn. This, too, was of the fibroblastic type and was described as arising from the choroid plexus. The patient in this instance was a 48-year-old woman suffering from headaches and weakness of the left extremities for one year. Examination disclosed two diopters of papilledema, left hemiparesis, hyperflexia and hemihypesthesia. Ventriculograms showed enlargement and a shift to the left of the left lateral ventricle. The right lateral ventricle was obliterated. The patient died toward the end of a craniotomy.

De Busscher[4] in 1935 recorded a psammomatous meningioma in the right occipital horn, presumably growing from the choroid plexus. His patient was a woman of 33, who complained chiefly of nocturnal headaches of one and a half years duration. Examination revealed right hyposmia, bilateral papilledema, right trigeminal hypesthesia and left hemiparesis, hyperreflexia and hemihypesthesia. Headache and papilledema improved for a short time following a decompressive operation. Death followed one month postoperatively.

De Busscher in his report of this case called attention to the previous case reports of Hosoi and Roscher, observing that each of the patients was a middle-aged woman and that the tumor in each instance was situated in the parieto-occipital portion of the right lateral ventricle.

Love[5] in 1935 reported the removal of a right occipital intraventricular endothelioma originating in the choroid plexus. His pa-

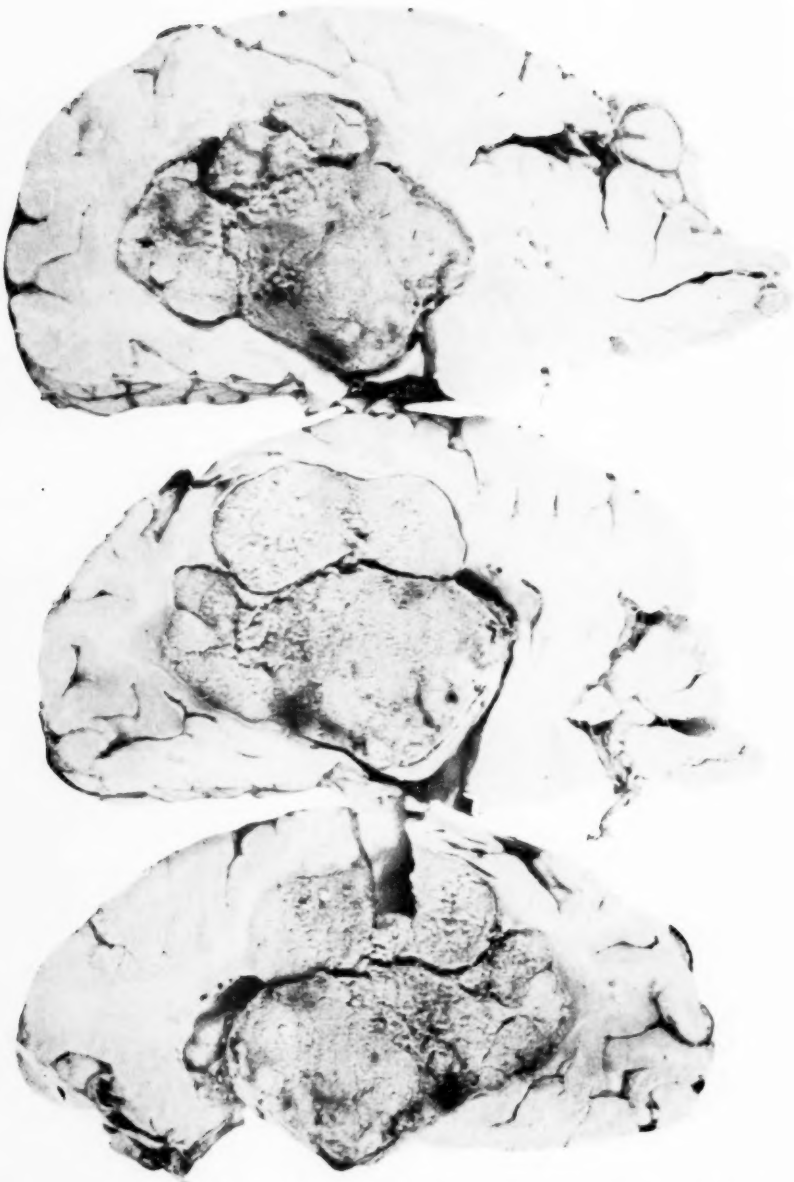

Fig. 1—Gross appearance of tumor, horizontally sectioned

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tient was a 45-year-old woman, who suffered from headaches, vomiting and diminished visual acuity for six months and uncinate fits for a few weeks prior to admission. The examination disclosed three diopters of papilledema, absence of the pupillary reflexes, left homonymous hemianopsia and weakness of the right sixth and seventh cranial nerves. Ventriculography suggested a right occipital lobe tumor. Complete removal of the neoplasm was effected at operation, following which the patient made a progressive recovery.

The report of the following case is based upon the record of a patient (A. E.—No. 1460) who was 62 years of age at the time of her death at Manhattan State Hospital in 1928. She had been a patient in that institution for 30 years. Throughout the period of hospitalization she had been diagnosed as suffering from dementia præcox. During all of this time she was "childish, disoriented, mentally feeble, hallucinated, etc." About eleven months before her death the patient was reported as being very feeble. Thereafter she grew steadily weaker. Apparently at no time did her condition seem to warrant extensive investigation of her neurologic status. Death followed an intercurrent lobar pneumonia. Necropsy revealed in addition to this finding, chronic aortitis, acute degeneration of the liver, acute cardiac dilatation and chronic interstitial nephritis. The brain, harboring the accidental finding of tumor of the brain, was forwarded to the New York State Psychiatric Institute for further examination.

Gross examination of the brain showed the right hemisphere to be larger than the left and its convolutions to be flattened. The structures at the base were displaced across the midline to the left. On section (Figure 1) a large, nodular, encapsulated neoplasm was found occupying most of the right lateral ventricle and situated entirely within it. The surrounding brain substance, though not invaded by the neoplasm, was considerably compressed by it. The tumor was found to be encapsulated everywhere, except where it was attached to the choroid plexus, with which it seemed to be continuous.

Microscopic examination revealed a multitude of cellular arrangements. The cells in some areas were arranged in a loose, connective tissue network containing numerous dilated capillaries. In others, the cells were closely packed in short, parallel rows and undulant bundles. There was a tendency for the short cell columns to run at angles to one another and to group themselves in irregular, widely anastomosing islands. Whorl formations were numerous (Figures 2, 3 and 4). Psammomatous areas were present, particularly in the region of the choroid plexus, suggesting an origin of the tumor from the arachnoidal portion of the choroid villi (Figures 5 and 6). Reticulin and collagen fibers were confined to the walls of blood vessels, some of which showed moderate thickening.

The predominant cell was of the elongated, bipolar type. Polygonal and round cell forms were also present. The nuclei were elongated, light staining and contained a moderate amount of finely granular chromatin. No mitoses were seen. The cytoplasm of the individual cells was relatively abundant, finely ganular and showed delicate fibrils traversing it. The elongated cells in many instances were arranged concentrically about central polygonal cells or around the walls of blood vessels.

Discussion

A clinical evaluation of the recorded cases fails to disclose sufficient material to warrant the postulation of a syndrome which might be of utility in diagnosis. Apart from the fact that each of the patients was a female, the reported instances have little in common. The ages varied from 14 to 62. Interestingly enough, in all of the reviewed cases, except that of Bailey and Bucy, which, however, does not seem germane to this report, the tumor was on the right side and in an equal number of instances occupied chiefly the occipital horn.* The symptomatology was not uniform. In two of the patients mental symptoms predominated. It is quite probable, however, that the mental disturbance present in the patient reported by us is not attributable to tumor as the condition was of too long duration and tended to remain stationary. Signs of intra-

*Dr. Leo M. Davidoff has recently presented a case of surgical removal of such a tumor, which occurred on the left side.

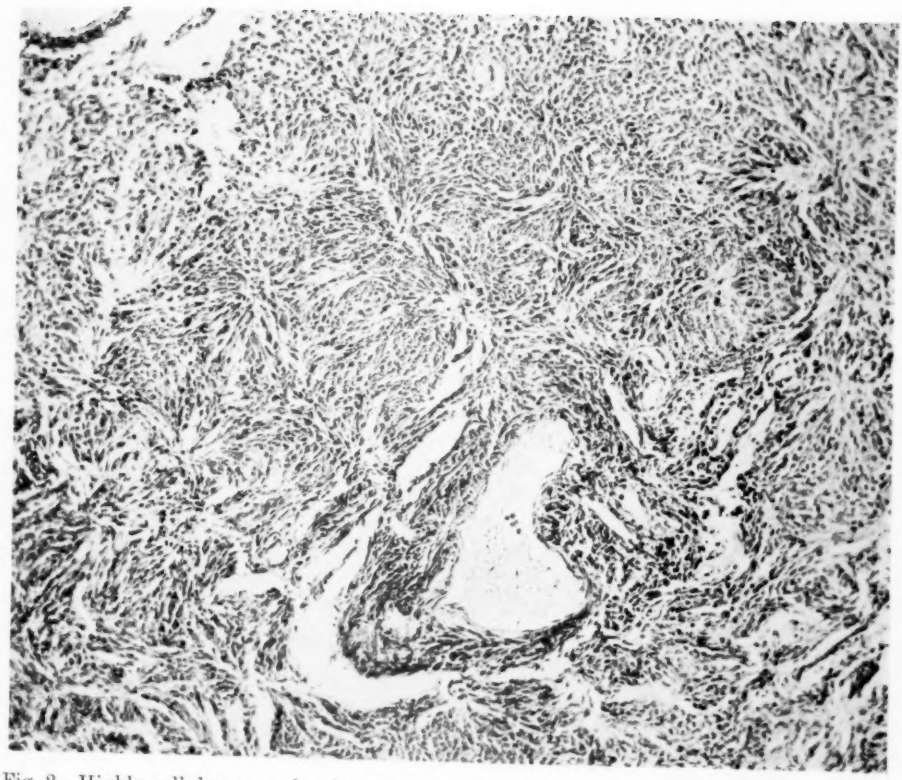

Fig. 2—Highly cellular zone showing numerous whorl formations. (120x) H. and E. stain

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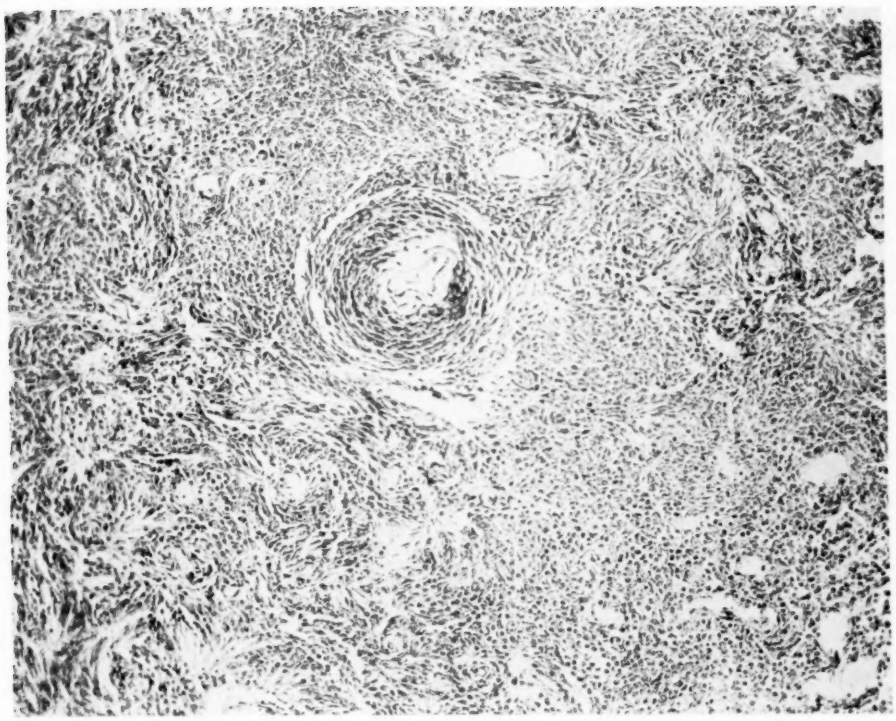

Fig. 3—Section showing whorl with many fusiform cells concentrically situated around blood vessel. (120x) H. and E. stain

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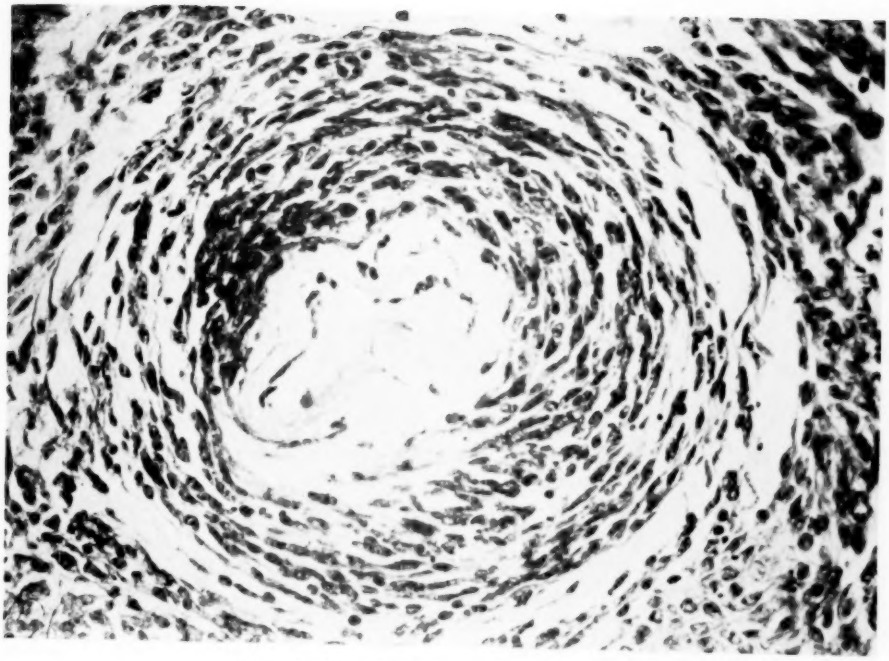

Fig. 4—Whorl shown in Fig. 3 (436x)

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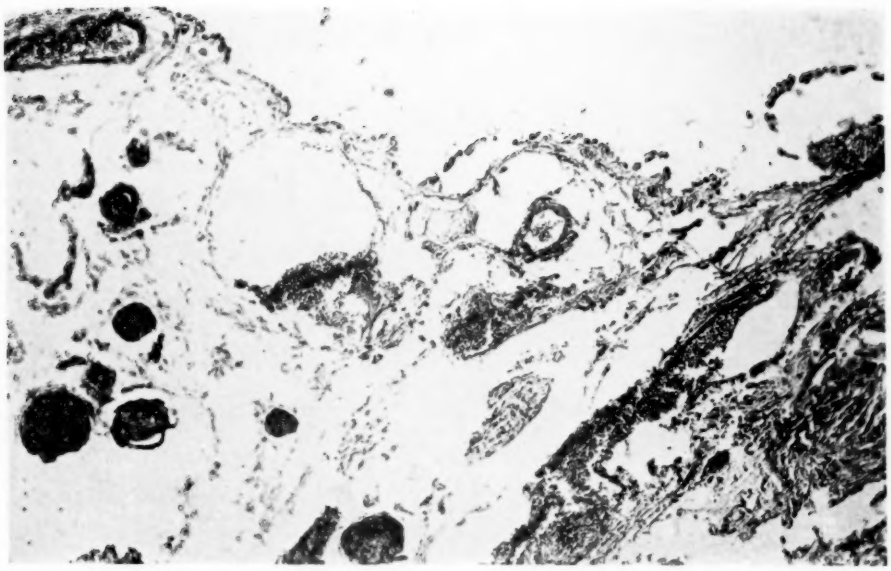

Fig. 5—Section showing relation of tumor to choroid plexus. The latter contains many psammoma bodies. (120x) H. and E. stain

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Fig. 6—Section through choroid plexus showing its close relation to strands of neoplastic tissue. (120x) H. and E. stain

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cranial hypertension, as evidenced by headache for six months to three years prior to admission, was a prominent feature in three of the five cases. Vomiting and diminished visual acuity were present in but one instance. Papilledema was the most consistent physical finding, being present on three occasions. None of the other findings occurred with consistent regularity. All in all, the only striking clinical feature appears to be that in all recorded cases, the disease occurred in a girl or woman. The most that can be said at the present time is that given a female with a clinically evident intraventricular tumor, one may entertain the diagnosis of a meningioma, bearing in mind of course the possibilities for other types of intraventricular tumor such as ependymoma, papilloma and the variety of polar spongioblastoma which occasionally invades the ventricle.

As to the nature of these tumors, the histopathologic reports appear rather convincing for their fibroblastic and psammomatous character. This should fit them into the group of meningiomas although strictly speaking their site of origin is at some distance from the meninges of the convexity. In considering, however, that the connective tissue portion of the choroid plexus originates from the leptomeninx invaginating through the transverse cerebral fissure, it would appear reasonable to regard these neoplasms as being of meningeal origin. For the present it seems preferable to speak of these tumors as intraventricular meningiomas rather than to provoke controversy by attempting to classify them along strictly histopathologic lines. If a histopathologic classification were in order, we would suggest the term "choroidal fibroblastoma." In this connection it is worthy of note that the primary fibroblastoma of the brain, the type of lesion previously described by Alpers, Yaskin and Grant[6] and Petit-Dutaillis and Bertrand[7] strikingly resembles the intraventricular meningioma, the only difference seemingly being one of location. The origin from fibroblastic pericytes in both instances appears probable. The intraventricular type appears rather conclusively to take origin from the arachnoidal portion of the choroid plexus. It seems reasonable to suppose that the arachnoidal granulations of the choroid plexus are capable of undergoing neoplastic change and that the calcified

bodies in the normal choroid plexus may represent psammomatous transformation of arachnoidal granulations. It is noteworthy that the majority of these neoplasms occupied chiefly the occipital horn, this despite the fact that choroid plexus is normally not to be found in this region. It seems a reasonable assumption, therefore, that the typical lesion takes origin from the glomus at the atrium of the lateral ventricle and grows posteriorly.

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THE ROLE OF PHYSICAL THERAPY IN THE TREATMENT OF NERVOUS AND MENTAL DISEASES*

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The evolution in the application of physical energies for the treatment of nervous and mental diseases forms an interesting chapter of therapeutics. It represents a change from crude superstition and empirical therapy into some well-controlled clinical methods resting on a rational theoretical and experimental basis. For many centuries, sufferers from mental disease were supposed to be "possessed" by Satan and were subjected to cruel physical restraint, such as being kept in chains with thieves and murderers. About one hundred and fifty years ago Pinel took off the fetters of mental patients at the Salpêtrière in Paris and espoused the use of various forms of hydrotherapy for their sedative and tonic effect on mental illness. Gradually other forms of physical treatment were introduced, especially electricity, but at first without either rhyme or reason. In Haynes' popular textbook on electrotherapeutics printed some thirty years ago one can still read such statements as "It is believed that the galvanic current penetrates the substance of the brain while the faradic current is distributed chiefly to the membranes," also: "This rule has been given for the use of galvanism in insanity: recent cases and functional diseases are benefited by it while old cases and structural diseases resist its influence." No wonder that in textbooks well-known neurologists recommended the use of electricity more or less in the form of a placebo or as a convenient means of disguising suggestive therapeutics and gave blanket recommendations for its use without specifying its form and without any reference to technique.

Modern progress in physical therapy, besides placing at our disposal many newer and efficient forms of physical treatment methods, has given us the correct conception of the mode of action of physical energies and their relation to pathological changes. Every physical measure exerts a primary physical effect on the body—

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thermal, chemical or mechanical—and upon the extent of this action depend subsequent physiological effects and influence on function, sensation or local pathological changes. These effects can be utilized either for treating the original cause or seat of disease, or to ameliorate its results and to maintain or restore necessary function. No form of physical therapy can be expected to restore highly differentiated elements of the central nervous system once they have been destroyed, but it is a fact that many of the pathological changes in the nervous system are subject to restitution or can be brought to a standstill. Table 1 indicates changes in the nervous system and the problems of treatment.

TABLE 1. CHANGES IN NERVOUS SYSTEM AND PROBLEMS OF TREATMENT
(AFTER VERAGUTH)

I. *Changes of possible reversibility*	I. *Treatment to facilitate*
a. disturbances of optimal excitability	a. return of optimal excitability
1. in vegetative nervous system	1. (physical, medical
2. in sensomotor part	2. and dietetic therapy)
3. in substratum of higher psyche	3. principally by psychotherapy
b. toxaemia	b. detoxication
c. inflammation	c. resorption
d. destruction of neurits capable of regeneration	d. regeneration
II. *Threatening or absolute irreversibility*	II. *Treatment to retard progress*
destruction of neurons through: toxaemia; inflammation; anomalies of circulation; mechanical force; foci causing pressure	physical, medicinal, diet therapy; possibly through surgery; possibly through X-ray therapy
III. *Treatment in all cases*	
Improve function of intact part of nervous system	
Care of connective organs	

It is evident that physical measures in the treatment of nervous and mental diseases must form part of general medical treatment and serve in the majority of conditions mainly as adjuncts of such treatment.

Effect of Physical Measures

The large field of physical therapy includes measures of different physical nature as shown in Table 2.

Table 2. Physical Therapy Methods

1. Electrotherapy
   - Galvanic current. Surgical galvanism (electrolysis)
   - Low-frequency currents. Electrodiagnosis
   - High-frequency currents—medical and surgical diathermy
   - Static electricity
2. Light therapy
   - Visible and infrared radiations
   - Ultraviolet radiations
   - Heliotherapy
3. Hydrotherapy
   - Hot and cold baths
   - Medicated and electric baths
   - Whirlpool baths, therapeutic pools
4. Mechanotherapy
   - Massage
   - Assistive and resistive exercise
   - Corrective exercise
   - Occupational therapy

For clinical purposes, including that of this presentation, the grouping of physical agencies according to their primary physical effect is more practical. The same basic physical and subsequent physiological effects can be accomplished by measures of different physical nature as best illustrated by the large number of thermal measures. This variety of measures serves for a suitable grading or alternation of the clinical effect. It stands to reason that not much advantage can be gained by employing elaborate procedures when satisfactory clinical effects can be accomplished by simpler means.

Table 3 shows a classification of physical agents according to their primary physical effect and serves as a guide for the brief discussion of their physiological effects and their clinical employment in nervous and mental diseases.

TABLE 3. PHYSICAL AND PHYSIOLOGICAL EFFECTS OF PHYSICAL AGENTS

(Exclusive of X-ray and radium)

Physical agent	*Primary physical effect*	*Secondary physiological effects*
Hot water Hot air Radiant heaters Incandescent lamps Diathermy Sun	Thermal	Hyperemia Sedation of sensory or motor irritation Attenuation of germs
Cold	Frigorific	Anemia Sedation or stimulation
Sun Heated metals Carbon arc Mercury vapor arc	Photochemical	Erythema Pigmentation Activation or ergosterol Effects on blood
Galvanic current	Electrochemical	Polar: vasomotor stimulation Interpolar: metabolic
Low-frequency, interrupted and alternating currents	Electrokinetic	Muscle and tissue contraction
Vibration Massage	Kinetic	Increase of venous and lymph flow, stretching of tissue, reflex stimulation

Thermal measures applied locally within physiological toleration, cause hyperemia and sedation of sensory and motor irritation. Clinically they are potent means for promoting resorption of the products of inflammation following trauma or infection and also serve to relieve many forms of local pain. Modern methods of diathermy and short-wave diathermy allow penetrating heating of deep structures including the brain. An additional effect of both local and general heating is the killing of thermolabile organisms. Research work of Warren[2] et al, established the thermal death time of various strains of gonococci at 106.8°F. in from 6 to 27 hours. Simpson[3] showed that an average of 107.8°F. body temperature for six hours is destructive to Treponema pallidum in experimental syphilis. Since it is possible to maintain local temperatures of 108° and more in joints and cavities by diathermy, such intense local heating is being employed as the first line of attack in gonococcal infections.

General heating at sufficient intensity brings about an increase of the circulatory rate and of metabolism, a rise in blood volume and oxygen consumption, and a change in the urine, blood and sweat to the alkaline side. Hot baths and electric light cabinets serve for milder degrees of general heating. Continuous tepid baths at a temperature from 94 to 98° serve as an effective form of sedation for disturbed patients.

Artificial fever therapy has come to the fore in recent years for increasing the protective and defensive mechanism of the body in many disease conditions. Physical agents offer the advantage that they are always available, that the febrile reaction is under complete control and that the procedure is sterile. Fairly uniform results are achieved by different physical methods such as hot baths, hot vapor, electric blankets, hot-air or infrared cabinets, general diathermy and short-wave diathermy. In these procedures, heat energy sufficient to overcome the heat regulating mechanism of the body is employed while suitable insulation prevents heat loss by evaporation. Body temperatures up to 107° can be maintained for several hours under suitable precautions.

The presumable clinical benefits of fever therapy have been summed up by Hench, Slocumb and Popp[4] as follows: (1) a direct bacteriolytic or bacteriostatic effect, due to the influence of heat itself on bacteria (without necessarily implying formation of immune bodies); (2) an indirect bacteriolytic or bacteriostatic effect resulting from increasing formation or mobilization of immune bodies; (3) a local effect from vasodilatation, providing an angmented blood supply to inflamed tissues, and (4) a general effect from the heightened metabolism incident to fever. The results of fever treatment in various conditions will be discussed further on.

Frigorific measures are employed in the form of cold wet packs for general sedation, short cold baths, douches and showers for circulatory stimulation and general tonic effects as well as in depressions and stuporous cases.

Photochemical measures in the form of natural or artificial heliotherapy are useful for general tonic effects in conjunction with general medical treatment.

Electrochemical measures in the form of the galvanic current serve as mild counterirritants and metabolic stimulants. Cerebral galvanism has a definite field of usefulness. The static head breeze is a mild sedative. Low frequency currents, including the faradic are indispensable means for electrodiagnosis and for stimulation of weak and paralyzed muscles. Electrical muscle exercise is of special importance in preserving muscular function in lesions affecting the lower motor neuron and causing real paralysis.

Mechanical measures in the form of massage and the static wave current serve to keep up muscular tone in case of weakness due to disease or general systemic inactivity. Massage also serves for general tonic and soothing effect in organic and functional diseases of the central nervous system. Colonic irrigations are valuable for mechanically relieving abdominal stasis and its systemic effects. *Therapeutic exercise* is indispensable for muscular reeducation in the same group of conditions; special exercises serve to teach alertness, steadiness and coordination. *Occupational therapy* is a most important adjunct in the physical and mental reeducation of all forms of organic and functional disorders.

All of the described measures exert a certain amount of psychic effect partly by their general tonic action and partly in the form of suggestive therapy. Under skillful guidance they offer a valuable therapeutic aid in psychoses and psychoneuroses. It is a frequent experience in mental hospitals that the mental status of many patients shows improvement while they receive physical treatment for a nonmental condition such as traumatism or arthritis.

Diseases of the Brain and the Spinal Cord

Hemiplegia. Physical therapy has a definite place in this condition for the early rehabilitation and reeducation of affected extremities, hastening convalescence and restitution and contributing to mental ease. Early treatment gives the patient a better chance of recovery; the final result naturally depends on the extent of the subsequent restoration of the affected motor areas. In the first week of hemiplegia while the patient may be still in bed, the application of radiant heat to the affected arm or leg will comfort and tend to relax the paralyzed limbs. Faulty positions of the joints

with subsequent contractures are prevented by simple splinting and frequent changes in the position. Passive movements should be performed early and be accompanied by gentle stroking massage. As soon as some muscular power has returned the patient should be instructed to reeducate the antagonistic movement at the joints, thus counteracting the tendency to contracture.

In the subacute stage physical treatment may be instituted in two directions. One is for accelerating the circulation in the brain. The author has seen patients in this stage complaining of headache and dizziness—not due to persistence of high blood pressure—frequently benefited by cerebral galvanism.[5] French authors have reported a favorable influence on contractures, gait and speech by short-wave diathermy to the brain. The second direction is for improving the vasomotor and sensory disturbances and the spastic paralyses. Graduated muscular contractions by a surging low-tension current combined with gentle massage and suitable exercise serve for this purpose. The application of radiant heat always should precede such treatments. In paresthesias and other painful sensations the monoterminal high-frequency (Oudin) current often gives relief. The patient should be encouraged to exercise his limbs for short intervals with care taken to avoid fatigue. Occupational therapy is important in keeping up the patient's morale and serves, too, as an adjunct to active exercise.

General paresis. Artificial fever therapy has proven of definite value in this affection. A recent survey by Neymann[6] shows that out of 809 cases treated by a number of clinicians by electropyrexia, 28 per cent showed complete remission and 35 per cent were improved; 2½ per cent died as a result of the treatment. According to this author the large number of improvements and the low death rate compares favorably with the statistics of malarial therapy, which show only a total of 30 per cent in remission or improvement and a death rate of 10 to 30 per cent. Fever therapy by physical means is less hazardous and there appears to be no other proven effect of malarial inoculation except that of producing fever. Neymann concludes that intense and prolonged treatment with a electropyrexia offers a decided hope of recovery to every

early case of general paresis and that the extent of psychotic manifestations has no bearing on the question of recovery.

A recent report of Hinsie and Blalock[7] on 326 patients observed for 10 years states that the most favorable clinical and serological results were observed in those pareties who received fever therapy followed by chemotherapy. This conclusion is shared by other observers who treated other forms of cerebrospinal syphilis.

In applying fever treatment to these cases it is important that sessions of sufficient intensity and frequency be given. Temperatures below 103-5°F. have little clinical value in any type of syphilis from 105 to 106° maintained for from four to seven hours is most preferable and should be repeated from two to three times a week for a series of eight to ten treatments.

Tabes. Results similar to paresis have been reported on the fever treatment of tabes, a tabulation by Neymann[6] showing 54 to 60 per cent improvement in 90 cases. I have been able to achieve about the same percentage of improvement in six cases of my own. A recent review of the French literature[8] recommends that fever treatment should be used mainly in progressive cases which appear clinically and biologically resistant to the usual specific treatment; that it is useful in relieving tabetic pains especially in those cases which are characterized by repeated shooting pains or gastric crises; it is also recommended in tabetic optic atrophy.

Other physical methods for the symptomatic treatment of tabes are diathermy either through the spine or to the spine and the site of the lancinating pains. The static wave current and static sparks are helpful for increasing the general strength and for improving paresthesias. Various forms of hydrotherapy serve the same purpose. Reeducational exercises are important for regulating coordination and steadiness.

Cerebrospinal syphilis and syphilitic optic atrophy. Fever therapy has been employed with a measure of success in these conditions as reported by Simpson[3] and others; combination with chemotherapy appears essential. In beginning optic atrophy mild galvanic treatment or diathermy are helpful by increasing local nutrition.

Multiple sclerosis. Encouraging results by fever treatments in a fair percentage of cases have been reported by several clinicians including the author. It must be remembered that spontaneous remissions in this condition are frequent; on the other hand there is no other form of therapy available. Previous to fever therapy diathermy to the spinal cord was recommended by the late Stephenson.

Myelitis. Physical treatment is useful in restoring function; paraplegia is benefited by gentle electrical muscular exercise or massage; incontinence of the bladder and rectum respond to the slow sinusoidal current. Colonic irrigations may be useful in suspected toxic cases. Decubitus calls for mild radiant heating followed by local ultraviolet. These measures when carried out persistently for prolonged periods are often rewarded by satisfactory improvement.

Sydenham's chorea. Striking results by fever therapy have been produced in this condition regardless of whether its etiology was infectious or psychogenic. Treatment in heat cabinets or by electromagnetic fever induction has proved safe and practical. Sutton and Dodge[9] and others have shown that it is possible to cut short an attack of chorea with a few treatments and attain recovery in the majority of cases. Carditis is no contraindication to treatment.

Acute anterior poliomyelitis. Physical therapy, combined with adequate braces or other orthopedic protection for the prevention of deformities, is indispensable for restoring the power of paralyzed muscles following poliomyelitis. The most effective agents are heat and muscle training by under-water exercises.

It is essential that in the acute state the patient be kept recumbent and the muscles and joints be immobilized in the favorable physiological position of rest. In this stage benefit can be obtained by the early application of luminous heat or infrared radiation several times a day over the affected parts; this does not interfere in the least with immobilization. French and American clinicians reported on a series of cases treated with diathermy in which trophic disturbances showed marked improvement and the extent of paralysis became less.

The convalescent stage of infantile paralysis may last from one to three years and is characterized by the tendency of the paralyzed muscles to recover their tone and power. A careful electrical test or muscle grading of the affected areas is essential for planning the treatment. Muscles without RD will recover spontaneously or the recovery will be sped up by appropriate therapy; those with RD may show varying degrees of affection and should receive treatment as early as possible. It is fortunate that the greater majority of muscles are weakened rather than paralyzed.

Carefully supervised muscle training is undoubtedly the most natural form of reeducation of weak muscles. Under-water exercises for institutional work and suitable small tanks for home use offer an excellent method for this purpose, but require a well-trained staff of instructors. If the muscles are without any power the passive performance of the motion is undoubtedly inferior to active contraction by electricity. Electrical stimulation must go hand in hand with muscle reeducation and be abandoned in favor of the latter as soon as there is return of active muscle power. Thermal measures—luminous heat, the whirlpool bath or diathermy—should be employed preliminary to electrotherapy. Supportive orthopedic measures must never be neglected.

The Neuroses

In the group of the so-called functional affections of the nervous system belong neurasthenia, hysteria, traumatic and occupational neuroses, various spasms, tremors, vasomotor and secretory disorders, and finally such ill-defined symptoms as headaches, sleeplessness and nervous exhaustion. In the management of these often very trying conditions physical measures play an indispensable part; they serve for the alleviation of symptoms, for general tonic effect and as chief adjuncts to psychotherapy.

In neurasthenics the combination of electrical and hydriatic measures is valuable. For general tonic effects electric cabinet baths, hot and cold douches, galvanic baths and, in milder cases, ultraviolet irradiation or the static charge or head breeze may be employed. The static wave current applied to the spine helps to raise the blood-pressure. The interrupted sinusoidal or other low-

tension and low-frequency currents applied to the abdomen help to overcome the motor and secretory weakness of the digestive tract. They may also be used for general body stimulation. The sexual weakness of neurasthenics often responds very well to the static wave current applied to the prostate. Cerebral galvanism may be considered in patients with stubborn head symptoms.

In contrast to neurasthenics, hysterical patients do not seem to take kindly to electrotherapy. Electrical measures should be used only as a last resort and preferably for definite pathological changes. Faradism is recommended for hysterical aphonia; the shock of painful stimulation brings back phonation in some patients. In paralysis, spasms and the variety of other disorders, static sparks, the interrupted sinusoidal or the Oudin current may be useful.

In sleeplessness due to nervous exhaustion a full or three-quarters cold wet pack is a classical measure for relief. In cases of low blood pressure the static modalities, notably the static head breeze, are helpful. General light baths may be also effective.

Mental Conditions

In contrast to the well established uses of physical agents in treatment of lesions of the central and peripheral nervous system with a definite pathology, no adequate clinical data about the employment of physical therapy are available in the large field of mental disorders, considered at present more or less functional. Cotton[10] reported a few years ago excellent results by physical methods in the treatment of the so-called functional group including manic-depressive insanity, dementia præcox, paranoid conditions and psychoneuroses. His work was mainly directed towards the recognition and elimination of suspected foci of infection such as the extraction of all infected teeth whether vital or devitalized, the removal of suspicious tonsils, the treatment of infected cervices by electrocoagulation and seminal vesicles by diathermy, in addition the overcoming of intestinal stasis and obstructive adhesions by colonic irrigation, the restoration of the muscular tone of the colon by diathermy and the surging alternating current; finally, the combating of marked depletion, inanition and low cal-

cium content of the blood by ultraviolet irradiation. No corroboration of the broad claims of Cotton has been published from competent sources, though the procedures advocated are rational and are routine methods in general physical therapy.

In the dementia præcox group, Cheney[11] has seen good results from neurocirculatory training, the hot air cabinet followed by needle showers and the Scotch douche. Ultraviolet radiation similarly results in a feeling of well being. For the treatment of acute excitement in the catatonic and hebephrenic forms the continuous bath at 98°F. is recommended, also the cold wet pack as an alternative. Hinsie,[12] Menninger and others reported on fever therapy in dementia præcox and found no lasting effect; Hinsie as a matter of fact found the ill effects outstanding.

In the author's clinic at Manhattan State Hospital in purely mental cases physical measures are mainly used for general tonic, stimulative or sedative effects, according to the indications. The fact that the hydrotherapy department is separate from this clinic, makes it difficult to evaluate physical measures as a whole in our work. Dementia præcox cases, if not too far deteriorated, showed some improvement in their mental state and became more easily manageable following general stimulation by ultraviolet radiation or the static bath; postencephalitis cases became more alert and showed more emotional stability following the same measures, and in selected cases following cerebral galvanism. Most of these patients showed improvement in their general physical condition, weight and nutrition. The great bulk of patients requiring treatment in the clinic were referred mainly on account of pathology incidental to or accompanying mental disorders—traumatism, arthritis and rheumatic conditions, etc. There is no question in our mind that the attention given to incidental conditions in these patients is well repaid by the favorable reaction on their psychic state.

Neuritis

Physical therapy is the main standby for relief of pain or paresthesias when the sensory nerves, and for the paralysis or paresis, when the motor nerves are involved. In toxic neuritis general

treatment measures must be added; and the ultimate prognosis in all cases depends on the removal of the exciting cause and the extent of the changes in and around the nerve or nerves.

In acute neuritic pain rest and relaxation of the affected area by light splinting or by a sling is often indicated. The use of mild doses of diathermy or short-wave diathermy followed by the Oudin current combines the analgesic effect with mild counterirritation. Between these treatments radiant heating may be kept up intermittently. In very acute cases, the use of sedatives often cannot be avoided, but can be tapered off as physical measures take hold. In resistant cases the galvanic current or iontophoresis with the vasodilating drug mecholyl may give relief. Local ultraviolet irradiation in a degree producing a mild dermatitis has been also extolled. In chronic cases mechanical measures, the static wave current, static sparks, faradization and careful massage serve to break up perineuritic adhesions and to exercise flabby muscles.

In Bell's palsy or rheumatic facial neuritis the immediate institution of "decongestive" measures counteracts the development of a reaction of degeneration. The probable explanation is that the perineuritic infiltration being primary, early dissipation prevents the secondary affection of the nerve fibers. There is no reason for the textbook advice that electrical stimulation is contraindicated at first; infrared radiation or diathermy may be employed from the outset and be followed by a mild static wave application to the parotid region. Strapping or other means to prevent sagging of the affected side should be employed at once. In the absence of a static apparatus a surging low frequency current may be used. Electrical testing is important for the prognosis of the probable duration for it will allow differentiation between light cases lasting a few weeks and moderately severe and severe cases in which recovery may take from three to nine months.

Brachial neuritis, intercostal neuralgia and sciatic neuritis are treated along the general lines already described. In alcoholic polyneuritis weakness of the lower extremities usually responds well to faradic muscle stimulation.

Summary

1. The employment of physical measures in the treatment of nervous and mental diseases must be based on the understanding of their physiological action on the body and on their subsequent effect on pathological changes.

2. The physical measures for the treatment of nervous and mental diseases comprise practically the full range of physical agents. Among these are local and general heating, including fever therapy, cold applications, ultraviolet radiation, the galvanic current and low frequency currents, the static modalities, massage, colonic irrigations, therapeutic exercise and occupational therapy.

3. Physical measures serve both for causal and for symptomatic treatment. They play an important rôle in the therapy of cerebrospinal syphilis and its sequelae, general paresis and tabes, in hemiplegia, in multiple sclerosis, myelitis, Sydenham's chorea, in paralysis following acute anterior poliomyelitis and in various forms of neuritis. In neuroses and mental diseases without a definte pathology physical measures serve for the alleviation of symptoms, for general tonic effect and as chief adjuncts to psychotherapy. In pathological conditions incidental to mental disease the employment of physical measures as a rule reacts favorably on the mental state.

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PSYCHIATRIC ASPECT OF HEAD INJURIES

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Introductory

The interest in the subject of head injuries has been greatly increased in the last two decades, especially as a consequence of many such injuries in the World War, but also because of the mounting hazards in industry and in traffic.

A brief historical background of the subject of head injuries is available in a review by Straus and Savitsky.[1] In this paper, they point out that the experience of the World War did much to influence the attitude of the medical profession toward the sequelae of injuries to the nervous system. It was the gross impression of many clinicians that the majority of the so-called neurotic manifestations were distinctly functional.

Straus and Savitsky, however, believed that clinicians too readily cited the experiences encountered during the war to substantiate theories of their own. Admittedly one must evidently be cautions in comparing this war experience with the problems met in times of peace.

There was considerable difference of opinion regarding the nature of the nervous and mental symptoms in soldiers. Strumpell, Nonne, and others emphasized the important rôle played by psychogenic factors, while Von Sarbo warned that many so-called functional manifestations were due to organic "microcellelular alterations."

The psychoanalysts stepped forth during the war and offered the result of more than a decade of intensive investigation to shed light on the controversial problem. They claim that these reactions are more than a "flight into illness." "The trauma situation endangers the integrity of the patient, is a blow to ego-security and results in regression to narcissism. There also arises an increased ego-sensitiveness owing to damming up of libido, with resultant hypochondriasis." These investigators also emphasized that the

difference in the response of persons to identical stresses lies not in constitutional peculiarities but in varying psychosexual experiences.

After the war there was a noteworthy reaction to the whole problem of neuroses following trauma. A group of writers, mainly German, emphatically denied the existence of a traumatic neurosis. They firmly insisted that there is no such disease entity and strongly urged the acceptance of their theory that the psychological reactions after an injury have no causal relation strictly speaking to the accident. Other writers remonstrated to such extremism and pointed out that whatever the exact pathogenesis the accident is a *conditio sine qua non* of the subsequent complaints.

As to the clinical picture Schilder[2] and Johnson[3] both postulate that since the important paper by Adolf Meyer in 1904 there has been no presentation in English of a detailed study of the symptomatology of head injury from the psychiatric point of view. Nevertheless, various phases of the subject have been studied and discussed by many authors.

In this partial review of the literature of the clinical psychiatric aspect of head injury the writer has generally followed the classification offered by Meyer, (which is still widely quoted) supplementing it by the additional contributions made in more recent years.

With an introductory comment Meyer[4] presents the following classification:

"Summarizing our experience concerning clinical distinctions, we should discourage the hope for a strict classification but suggest as salient types and as a means to keep order among the facts:

1. The direct posttraumatic deliria with the following subdivisions
   a. Preeminently febrile reactions
   b. The delirium nervosum of Dupuytren, not differing from deliria after operations, injuries, etc.
   c. The delirium of slow solution of coma with or without alcoholic basis
   d. Forms of protracted deliria usually with numerous fabulations, etc., (with or without alcohol or senile basis)

2. The posttraumatic constitution
   a. Types with mere facilitation of reaction to alcohol, grippe, etc.
   b. Types with vasomotor neurosis
   c. Types with explosive diathesis
   d. Types with hysteroid or epileptoid episodes with or without convulsions (such as most reflex-psychoses)
   e. Types of paranoiac development
3. The traumatic defect conditions
   a. Primary defect allied to aphasia
   b. Secondary deterioration in connection with epilepsy
   c. Terminal deterioration due to progressive arteriosclerosis
4. Psychosis in which trauma is merely a contributory factor
   a. General paralysis with or without traumatic stigmata
   b. Manic-depressive and other transitory psychoses, catatonic deterioration and paranoiac conditions with or without traumatic stigmata

The Direct Posttraumatic Delirium

Concerning the immediate result of a cranial injury Meyer writes that usually the person is more or less completely stunned or at least dazed. At times the coma sets in after a brief latent interval, especially in meningeal hemorrhage, or after several days. The awakening from the coma may then lead through a brief period of partial consciousness or actual delirium. In but a few cases the active delirious states exceed mere sopor, i. e., a dreamy condition from which the patient can be aroused only for a few moments with difficulty of grasp on the situation. In the cases extending over several weeks or more are recognized clinically the cases of primary traumatic insanity. Meyer further comments: "The types presented by our cases of primary traumatic insanity showed besides an absence of manic-depressive symptoms a certain tendency to dream states, fabrication of whole situations and great inconsistency of statement but no hallucinosis. They were all committed owing to impulses and restlessness."

More recently Schilder[2] reported a detailed study of 35 cases of acute psychic disturbances following serious head injuries. He does not attempt to subdivide this group of cases into various types but rather presents various stages of the pure syndrome which at times may be colored by the personality of the patient.

The majority of his cases presented the following sequence of events: "There is primarily the state of unconsciousness . . . In many of our cases it changed into a state of deep clouding with restlessness and attitudes of resistiveness which were partially psychic, but also had an organic component. When the patient could be made to speak there was clouding of consciousness and disorientation in space and time. This state is hardly ever missed completely, it may last a long time . . . When this state lasts longer, then a deep bewilderment and helplessness may be present. Tachistoscopic examination shows that the patient needs a longer time to come to any perception. The perceptive function as such is retarded. Besides the retardation in the perceptive function there exists a difficulty in the synthesis of primitive impressions into a unit. . .There is a deep going basic disturbance in the gestalt functions. Visual motor gestalt patterns show a very primitive structure . . . The perception and the gestalt difficulties certainly contribute to the disorientation and are basic for the helplessness and for the confusion . . . In many of the cases reported here the stage of confusion subsided quickly. The perceptive difficulties and the disturbances in the gestalt functions are then only present in a minor degree and may finally be completely absent.

"During the confusional states memory and judgment are impaired. But the impairment of the memory, especially for recent events, is more outspoken. When the perception and gestalt function disturbances subside, the picture of a Korsakoff psychosis remains . . . The perception and gestalt disturbances can then be completely absent. The confabulatory element does not go parallel to the memory disturbances and may even be present when the memory has come back to normal. Although in some of the reported cases alcoholism was a complicating factor, alcoholism is in no way a necessary factor in the genesis of the traumatic Korsakoff. In all of the cases reported, there is a particular amnesia

concerning the accident in the confusional state as in the Korsakoff state." In some cases amnesia may gradually clear up, in others the amnesia persists. Amnesia for the accident may be the only lasting psychic symptom. Schilder further states: "It is astonishing how little the patients are concerned about their head injuries. They do not appear in dreams. It is another outstanding part of this confusional state and that of Korsakoff psychosis that the psychic material which appears is rather impersonal. In the average case comparatively little of the previous personality appears in the psychosis. It is as if an impersonal province of the psyche was affected." The above statement applies to the majority of the cases studied. There were some cases, however, in which the general symptomatology as described above, was colored by various moods. These were carried over from the patient's everyday life preoccupations in the posttraumatic psychosis or represented an exaggeration of previous personality traits.

As to the changes in the mood after head injury, Schilder and his coworkers noted immediately after the accident a general tendency toward resistiveness. Bewilderment, apathy, indifference, with euphoria (especially in the Korsakoff cases) may follow. Whereas the confusional state is characterized by the mood of helplessness and bewilderment, the Korsakoff state often shows the mood of serenity and mild euphoria in spite of the persistent headaches. In a group of cases more definite changes in the mood may be in the foreground, such as depression, and worries. In other cases there may be an empty excitement similar to mania, but more monotonous and more empty. Encephalitic-like monotony and a tendency to pester are found in a group of head injuries in young people. In other cases the picture may still more resemble manic states. In cases in which paraphasias and sensory aphasias are present, euphoria, manic attitudes, optimism, and lack of insight into the defectiveness may prevail. Moodiness, irritability, and a strong feeling for their defectiveness has to be expected in cases with motor aphasia. In a case with parietal lobe symptoms a hypochondriacal attitude has been observed.

Russell[5] describing the general course of events which may follow a head injury states that immediately after the blow the

whole of the nervous system may be paralyzed, even the respiratory and cardiac movements may cease. If recovery is to occur, the heart and respiration recommence. Involuntary movements of the limbs then occur and the reflexes return. Speech returns with a few words or phrases and movements become more purposeful. Up to this stage it is mainly the lower mechanisms of the brain that are recovering, and the similarity between cases is great. The higher cerebral functions, however, differ in every individual, and the stages of recovery of these functions produce widely different clinical pictures. The mental condition may simulate any of the states seen in alcoholic poisoning; in both conditions the clinical picture probably depends on the individual psychological structure and balance. Thus the patient may be drowsy or talkative, docile or aggressive, impudent or irritable. He is never reserved; he may tell you his secrets, may be boastful or affectionate and may even attempt to bribe his attendants to let him out of bed. Then, comparatively suddenly he looks around and asks where he is. He has now recovered full consciousness and returns to his normal behavior and treats those who are looking after him with the customary civility. These changes indicate that the higher functions of control and inhibition have again taken charge of his behavior. The recollection of events shortly preceding the accident may usually be taken as an indication that full consciousness has returned. In states of confusion, disorientation and altered personality which may occur before full consciousness returns the patient has no recollection of events shortly preceding the accident. When, however, the memory of events preceding the accident was present, it was never found in the present seris (of 96 cases) to be other than accurate. With regards to events following the accident, the patient's ideas may be permanently inaccurate.

Symonds[6] approaching this subject from a psychological point of view makes the following general comments: "At one end of the scale is the case of minor injury in which there may be no visible evidence of unconsciousness. In such cases the depth of disturbance is shallow. In Jacksonian phraseology the highest level of cerebral function only has been affected, that which has been responsible for the consolidation of current experience into memory.

All the levels below this are working normally. The resulting picture, therefore, is that of highly coordinated activity. The terms traumatic automatism and traumatic amnesia have a useful descriptive value for such phenomena. At the other end of the scale there is the patient who lies, perhaps for some days in a state of vegetative activity, unresponsive except to painful stiumli, taking food automatically, and passing urine and feces into the bed. All levels above that of vegetative and noci-reactive functions are out of action. Between these states there is that which has been called cerebral irritation—the uninhibited, confused, and often violent behavior which results from disturbances of intermediate depth. Traumatic stupor for the former state and traumatic delirium for the latter are terms which have the merit of describing clinical symptoms without the implication of pathology."

The Posttraumatic Constitution

It is generally agreed that excessive alcoholism renders a person more vulnerable to brain damage after a head injury and that people with brain damage are much more susceptible to toxic effects of alcohol.

Schilder[2] attempts to explain this interrelationship between alcoholism and head injuries: "A few remarks are in place regarding the relation of psychosis after head injuries to alcoholic psychosis. In a comparatively large number of our cases, alcoholism was a complicating factor. It is true the alcoholic exposes himself more easily to the traumatic situation. In addition to that we have to assume that the periventricular gray in the alcoholic is attacked by the alcohol and so becomes predisposed or slightly changed. One may suppose that the possibility of hemorrhages especially around the ventricular system, is greater in the alcoholic . . . There are many common features between the psychoses with encephalopathia alcoholica and the posttraumatic psychoses . . . The similarities in the clinical pictures point to pathophysiological mechanisms, which are based on the severe disturbance in the ventricular gray in connection with the cortical lesions."

As to the susceptibility to febrile disorder Meyer[4] reports three cases:

One man received a skull fracture at the age of 22 years and had some peculiar sensations and possible hallucinations after a blow on the abdomen at 25 years. At the age of 40 years (18 years after the head injury) after an attack of laryngitis with fever he developed a quasi-delirious attack which lasted about three weeks. He remained well for a year when two days after the onset of a severe cold he developed another attack similar to the first, but of milder degree and lasting about two weeks.

The second case was that of a man 66 years of age who on March 1, apparently received a head injury which was followed by slight weakness on the right side and nervous uneasiness. On March 15 of the same year during a febrile episode he displayed slight confusion and unreasonableness. This condition cleared up in about three weeks.

The third case is that of a girl who at 18 years prior to the head injury had a "peculiar nervous attack lasting about a month." The same year she sustained a head injury which was followed by unconsciousness for 48 hours and two to three days of confusion, but recovered completely. The next year she fell when dancing, and was unconscious for two hours. For a week things were blurred before her eyes. She did not lose any work however. Two years after the second cranial injury the patient developed an attack of grippe which was associated with "hypochondriacal depression and attitude of persecution with possible hallucinations with confusion of facts of current events." The disorder resembled dementia præcox. On physical examination there were noted many minor neurological signs. The patient made a complete recovery in about five and one-half months.

These cases are presented in some detail because the writer did not come across a description of similar clinical entities in more recent literature.

Some patients, after recovery from the immediate effects of the head injury, may suffer from after effects in the form of slowly developing constitutional changes. The most typical of such changes is Friedmann's vasomotor complex, the symptoms of which consist of headache, dizziness, irritability, insomnia, physical and mental fatigability, a certain change in character and intolerance

of alcohol with which may be associated a memory defect of the type of retrograde amnesia, which however is not a part of the complex, although there may be a certain memory defect which is quite common to all highly nervous worried people. The headache is apt to be complained of as a feeling of pain or a peculiar feeling of fullness, especially on stooping over. The dizziness is also characteristically intensified by stooping or by sudden movements. (White and Jelliffe[7])

Another type of posttraumatic constitutional change is described under Kaplan's "explosive diathesis." This consists primarily in great irritability, especially after alcohol, sometimes leading to acts of violence, often quite unmotivated, i. e., automatic, or even to an epileptic seizure. (Henderson and Gillespie[8]) Sometimes associated with explosive diathesis but also occurring alone, are temporary dream states. In connection with the same subject Meyer[4] comments: "Frequently associated with the latter (explosive diathesis) but also occurring alone, without explosive traits, we found in our cases as a very important factor *all the possible degrees of episodes of more or less dazing and dream states*: from a temporary dazed feeling to episodes of hysteriform or epileptoid absences. Apart from the subjective feeling of haziness, the characteristic trait is the occurrence of complete dream interpretations and peculiar fabrications which color the primary traumatic insanity as well as the subacute and episodic types and even the paranoic type. They are by no means limited to traumatic states, but also are observed in brain tumor, brain syphilis, after insolation, which after all belong to similar types of brain alteration."

Kaplan[4] observed that all these transitory complicated and simple phenomena occur both spontaneously and with physical and mental exertions, in affective excitements, with even moderate use of alcohol, in lust, and especially on sudden changes of position of the body.

Glaser and Shafer[9] divide convulsive states following trauma into three groups: "focal epilepsy, true epilepsy, and hystero-epilepsy." In the authors' experience hysterical convulsive states occurred from one to two months after the injury, whereas organic convulsive states generally first made their appearance from eight

months to five years after the injury. Incidently in all the cases of hystero-epilepsy associated with posttraumatic psychoneurosis reported by Glaser and Shafer, the convulsive states were entirely relieved by psychotherapy and readjustment of their difficulties, plus sedatives.

Commenting on the incidence of convulsive seizures following head trauma, Eckel[10] stated that various observers after a study of a large number of cases of head injuries of various forms during the World War found that the incidence of the seizures was about five or six per cent. Kennedy[11] and Wechsler[12] quoting much variable statistics on such incidence comment that such a variety of clinical statistics must come from regarding as alike many unlike abnormal conditions, and because the cases studied are not comparable and the materials, no less than the observers, vary to such an extent that it is difficult to find a common basis for reckoning percentage incidence.

As to types with paranoid development Meyer[4] states that in quite a few patients the traumatism has a decided part in the subsequent development of a paranoic symptom complex of by no means typical nature. The author presents two cases which illustrate this type of reaction.

One case is that of a bright boy of happy disposition who became totally blind a short time before an accident. At the age of 20 in an injury by a train he sustained several fractured bones, had bleeding from the nose and mouth for a few hours, and unconsciousness, involuntary micturation and defecation for three days. After the accident the patient became peevish and irritable. About six years later he became exceedingly cross and ill-tempered, quarrelsome, and would strike on the least provocation; he claimed that people were talking about him and making fun of him. At the age of 28 years he began to argue on religious subjects. He accused his sister of trying to poison him, tasted kerosene in his tea and became violent to his sister and neighbors.

The other case is that of a woman with slight constitutional defect. At the age of 26 she received a head injury and was unconscious for 18 days. After this, she had loss of memory, would easily become impulsive, began to imagine people said unkind

things about her, made up a story about settlement of her case in court, and expressed delusions of poisoning. Three years after the injury she was admitted to the hospital, where she continued with many paranoid delusions, sexual trend and with greatly varied, not fairly systematized fabrications. Her memory for dates was described as "very fair." Her application was satisfactory. In the light of prevailing opinion at the present time such cases could hardly be differentiated from those classified by Meyer as "psychosis in which trauma is merely a contributing factor."

To sum up the general after effects which may follow a head injury the writer would quote Koppen,[4] about whose description Meyer comments: "There is little to be added to what Koppen says." From the review of some of the literature the writer tends to believe that Meyer's comment made in 1904 still holds true. Most of the recent writers when discussing this syndrome limit themselves to the enumeration of the general symptoms such as: "headache, dizziness, irritability, fatigue, poor memory, etc." Koppen's description of the general after-effects of head trauma as quoted by Meyer is as follows: "Men . . . complain especially of all kinds of sensations in the head which they describe either as pain or as pressure with feeling of crawling or of dullness of the head, more or less definitely located at the point where they were hit. They frequently become dizzy and at times faint for a short time without any epileptic attack. Although slight attacks of dizziness may occur frequently, epilepsy with typical attacks need not develop. There is further in our patients a great irritability and nervosity. The formerly good natured or even tempered persons become irascible, hard to get along with; formerly conscientious fathers cease to care for their family. The irritability at times increases to excessive violence in which actions occur of which they have no remembrance; the nervous system not only is under the influence of psychic irritation but is especially susceptible to the influence of alcohol or tobacco in even small quantities.

The working capacity of our patients is very poor. It suffers variously, although such individuals often give the impression of perfect capacity; and since the morbid symptoms are essentially subjective, they always arouse doubts whether they could not do

something at least, even if they are unable to work in a noisy shop or on a high scaffolding. It is, however, certain that the patients are very forgetful; in giving orders or doing errands they make the most incredible blunders; frequently everything must be written down. Their capacity for thought has suffered, as is sometimes shown especially in the great slowness of thought. These patients are unable to concentrate their attention, even in occupations which serve for mere entertainment such as reading or playing cards. They like best to brood unoccupied; even conversation is rather obnoxious. This point is so characteristic that it gives a certain means of distinction from simulation which as a rule does not interfere with taking part in the conversations and pleasures of the ward and playing at cards, which means as a rule too much of an effort for the brain of actual sufferers. The patients are usually advised to take light physical work, but even there they are perfectly useless. Excessive sensitiveness of their head obliges them to avoid all work which is connected with sudden jerks, bending over is especially troublesome; there is hardly any physical work in which this can be avoided; the blood rushes to the head, headache increases, dizziness sets in and the work stops. The patients feel best when in the open air, inactive and undisturbed. There are but few objective signs, such as increase of pulse, flushing of the face, dermatographia, trembling and uncertainty in the Romberg position, such as is shown in all general nervosity. But the complaints are so exceedingly uniform that this uniformity of the subjective complaints justifies the conclusion that they are well founded."

The uniformity of subjective complaints following a head injury in people of diverse social and economic strata and regardless of any legal implications has been also noted by some of the more recent observers who employ this fact as one of the arguments in support of the assumption that the head injury is the primary cause of such subjective symptoms.

One special form of posttraumatic constitution (traumatic encephalopathy) which did not receive much medical attention is a condition first described by Martland[13] under the name of "punch-drunk." This condition occurs mostly among prize fighters but has also been noted in football players, and for some time was recog-

nized by fight fans and promoters. Martland states that punch-drunk most often affects fighters of the slugging type, who are usually poor boxers and who take considerable punishment, seeking only to land a knockout blow. It is also common in second rate fighters used for training purposes, who may be knocked down several times a day. It occurs in mild or severe form in almost fifty per cent of fighters. The clinical picture of "punch-drunk" presented by Martland is about as follows: "The early symptoms of punch-drunk usually appear in the extremities. There may be only an occasional and very slight flopping of one foot or leg in walking, noticeable only at intervals; or a slight unsteadiness in gait or uncertainty in equilibrium. These may not seriously interfere with fighting. In fact, many who have only these early symptoms fight extremely well, and the slight staggering may be noticed only as they walk to their corners.

"In some cases periods of slight mental confusion may occur as well as distinct slowing of muscular action . . . Many cases remain mild in nature and do not progress beyond this point. In others a very distinct dragging of the leg may develop and with this there is a general slowing down in muscular movements, a peculiar mental attitude characterized by hesitance in speech, tremors of the hands and nodding of the head, necessitating withdrawal from the ring.

"Later on, in severe cases, there may develop a peculiar tilting of the head, a marked dragging of one or both legs, a staggering, propulsive gait with the facial characteristics of the Parkinsonian syndrome, or a backward swaying of the body, tremors, vertigo, and deafness. Finally, marked mental deterioration may set in necessitating commitment to an asylum."

Carroll[14] presents a composite clinical picture of punch-drunk about as follows: "The earliest signs of the condition are the diminished tolerance to blows and slipping in defensive ability which may result in external injuries such as flat nose or cauliflower ears. Later the people in close contact with the man begin to notice changes in him. They find that he developed deterioration in attention, concentration and memory. Then may follow an impediment in speech, 'the eyes may become slightly glazed or have a

staring expression.' 'In short, he may continuously simulate a person who is just a little drunk.' 'These symptoms may progress for a period of a year or so, when they will usually become stationary.

"In severer cases the voice may become thick, halting and gutteral, as though there was something held in the mouth. The gait may become unsteady. In a few instances vision may begin to fail or some degree of deafness may appear. Headache, dizziness, and tinnitus, which one might expect as symptoms, are often present for a few hours or days following a fight, but they rarely persist as a part of the syndrome. Mental and personality changes become more marked, and emotional instability becomes apparent. Involuntary habit movements of a boxing nature are common, and are frequently displayed, even years later, when the person is abstractly preoccupied or during periods of emotional stress . . . Punch-drunks almost universally do not realize that there is anything wrong about themselves or their conduct." Carroll further comments: "In punch-drunk the prominence of objective mental changes and freedom from symptoms are in contrast to the post-concussion syndrome in which subjective complaints are prominent and objective mental changes are not often seen."

Martland is of the opinion: "that in punch-drunk there is a very definite brain injury due to single or repeated blows on the head or jaw which cause multiple concussion hemorrhages in the deeper portions of the cerebrum. Such hemorrhages are very apt to occur in or near the corpora striata, in the corona radiata but almost never in the cerebral cortex or below the tentorium cerebelli. These hemorrhages are later replaced by a gliosis or a degenerative progressive lesion in the areas involved. Therefore, in late stages the symptoms often mimic those seen in diseases characterized by the Parkinsonian syndrome."

Carroll also feels that the bizzare nondescript clinical picture seen in cases of punch-drunk can probably best be explained on the basis of small descrete vascular lesions. Parker[15] after presenting a detailed neurological analysis of three cases of punch-drunk, each having advanced physical disability, concludes that the clinical picture in each case was very complex and it differed in one case from

the others. The only agreement, however, was in the suggestion of the diffuse or scattered lesions of the brain affecting different systems at one and the same time.

Traumatic Defect Condition

As to the traumatic defect conditions or posttraumatic mental deterioration there is not much that has been written. As stated previously Meyer[4] classifies these conditions as follows:

1. Primary defects allied to aphasia. These apparently result from severe brain damage caused by and immediately following the injury.
2. Secondary deterioration in connection with epilepsy.
3. Terminal deterioration due to progressive alterations of the primary injured parts with or without arteriosclerosis.

The statistical guide of the New York State Department of Mental Hygiene[16] defines this condition as follows: "Here are to be classified those cases which following severe or apparently slight head injury with or without an acute or protracted delirium develop a gradually increasing mental enfeeblement or dementia."

Psychoses in Which Trauma Is Merely a Contributory Factor

As to the relation of trauma to general paresis Klauder and Solomon[17] state: "Trauma that is alleged to play a rôle in the production of symptoms of dementia paralytica is required by all writers to involve the head and to be of sufficient intensity to injure the brain, as evidenced by symptoms of brain concussion or fracture of the skull." According to these authors "there has been a rather general judicial acceptance of the etiological rôle of trauma in the causation of dementia paralytica subject to some reservations." These reservations were formulated by Regis and Verger, who have exhaustively studied the subject, as follows: (as quoted by Klauder and Solomon) "that at the time of the injury the patient was in his habitual state of mental health and had not previously presented either cerebral symptoms or modification of intelligence or character; that the interval (intercalary period) between the shock of the injury and the first characteristic symptoms of dementia paralytica has been neither too short nor too long," (that is, from

a period of months to two or three years—a period of from one to six months is probable, that from six months to 30 months is very probable, beyond 30 months is less and less probable) "that the injury and characteristic symptoms of dementia paralytica are related to each other by a series of posttraumatic symptoms, which are usually intense headache, vertigo, character changes and, exceptionally, epileptiform seizures." The most accepted hypothesis of the rôle played by the trauma is that cranial injury activated an existing pathological process of dementia paralytica in the preclinical stage.

The majority of writers who express themselves on the relation of head trauma to so-called psychogenic psychoses (which grossly include paranoid reactions, dementia præcox, and manic-depressive psychoses) agree that there is no direct relationship between the two.

It may be in order to quote a few opinions on this subject. Hadley[18] states: "Certain psychic phenomena may be mentioned which having occurred subsequent to head injuries, have been ascribed to trauma. Their relationship to psychogenesis seems fairly obvious even though there seems no good reason for denying the injury as the exciting and extenuating factor." Osnato[19]: "Trauma even when not directly to the head may precipitate a depression or manic state in one possessed of the manic-depression constitution. Trauma alone can not cause dementia præcox. When it plays a part it acts as one of the contributing emotional factors and its influence on the development of psychosis is fleeting. It may give a temporary emotional coloring to the picture and may supply material ready to hand for delusional elaboration."

Woodman[20]: "Experience does not find manic-depressive attacks, dementia præcox, or paranoid reaction often or definitely associated with severe head injury. In the few instances where they occur together the causal relation of the injury is not proven."

Wechsler[12]: "Whether trauma to the head can cause manic-depressive state, a schizophrenia, a paranoia, or a melancholia is doubtful. But if trauma may precipitate a psychosis, the injury need not necessarily be to the head."

Meyerson[12] is of essentially the same opinion.

Alfred Gordon[22] is also in agreement with the above point of view. In support of his belief he presents a study of 11 patients with definite head injuries whose previous medical and social history was thoroughly investigated. These patients began to display psychopathological manifestations many months or years after the initial injury to the head, without showing any neurological signs and in many cases "after the cranial damage had been successfully repaired." On the other hand it was observed that the mental disorders were invariably preceded by strong emotional force of an abnormal character.

Psychoneuroses Associated with Head Trauma

It would appear from the more recent literature that there is very little distinction made between the clinical picture of "posttraumatic constitution" of the older writers, which was attributed to the after-effects of severe head injury and the clinical picture of the "traumatic encephalopathy" which is assumed to follow apparently minor head injuries. For example, E. E. Meyer[23] described the symptom complex of posttraumatic constitution as that following "slight symptoms of concussion." Ebaugh[24] in his classification of posttraumatic minor personality disorders heads Group I as "Traumatic Encephalopathy" (traumatic constitution). The Statistical Guide of the New York State Department of Mental Hygiene[16] describing "Posttraumatic Personality Disorders" states: "This term is used in place of the former designation of posttraumatic constitution and is intended to apply to those cases showing posttraumatic changes in disposition, with vasomotor instability, headache, fatigability and explosive emotional reactions, intolerance to alcohol and sometimes convulsive seizures. A complete history of the previous personality reactions and a careful evaluation of the present reaction are often necessary to rule out psychoneuroses."

As these symptoms of posttraumatic constitution or traumatic encephalopathy are primarily subjective in character it frequently has been found difficult to differentiate them from functional disorders in which a head trauma may play only a secondary contributing rôle.

The writer purposely dwelt in some detail on the clinical manifestations which were attributed by the early writers to the after-effects of severe head injury and later variably described under such headings as "slight symptoms of concussion," "posttraumatic personality disorders,"[12] or "traumatic encephalopathy." Very little has been contributed recently to the clinical description of the above syndrome. There has accumulated, however, a considerable amount of literature on the matter of interpretation of these symptoms. The questions discussed are: Is the head trauma directly responsible for the syndrome, or does it play only a secondary contributing rôle? What are the underlying pathological changes in the brain associated with symptoms? Is there any organic basis for the clinical picture or is it primarily a result of psychogenic forces?

Wechsler[12] states that diagnosis of traumatic encephalopathy depends on criteria other than symptomatology. "In itself the condition does not differ in any wise from that of traumatic hysteria."

And thus we enter the field of traumatic psychoneuroses which is fraught with well recognized controversies, as evidenced by such statements as:

Ebaugh[24]: "The differential diagnosis of traumatic encephalitis from functional disorders can be extremely difficult; it is therefore not surprising that considerable difference of opinion and perhaps some confusion concerning these conditions still exist."

Sands[25]: "The most perplexing and the most annoying of the after-effects of brain injuries are various manifestations of behavior disorders which many patients show after they have recovered from the acute stages of the injury. There are so many conflicting opinions expressed even by competent observers that they have become a subject matter of the cynic."

George W. Hall and Roland O. Mackay[26] comment on the same subject: "One of the oldest questions which trouble the mind of the physician is that pertaining to those frequent and baffling nervous states following trauma . . . An age-old conflict is being waged today, as in years gone by, between the exponents of the so-called organic and functional interpretations."

Wechsler[12]: "To add to the difficulties, many clinicians use dif-

ferent terms for the same condition or the same term for different conditions. One finds the diagnosis of traumatic hysteria and traumatic neurosis used interchangeably and indiscriminately and the diagnosis of concussion is capriciously applied to clinical syndromes which neither from the history nor from the symptomatology can be differentiated from the other two."

It would be of very little use just to enumerate various classifications, offered by different students of this subject, such as Hadley[18], Osnato[19], Solomon[27], Hall and Mackay[26], Straus and Savitsky[1], Wechsler[12] Sands[25], and others. On the other hand under the circumstances it would be futile and confusing to recite in detail each syndrome described under various headings in these classifications. As one reads the description of these syndromes there is noted considerable similarity in the clinical pictures presented although interpretation of the underlying mechanisms or pathology may be different.

Most recently an attempt to clarify this phase of posttraumatic sequelae was made by Ebaugh[24].

The author refers to the book written by him and Benjamin on Trauma and Disease. In this book after mentioning the contributions of several other writers, the authors suggest a classification of the posttraumatic minor personality disorders, which in many respects coincides with that of Wechsler, and basically does not differ much from an earlier presentation by Osnato.

Wechsler[12] reporting on a study of 100 cases submits the following classification of the syndromes in cases of head injuries in which the symptomatology is essentially psychic or mental:

1. Malingering—Wechsler defines this condition as follows: "The individual becomes a malingerer only when he consciously and purposely in order to deceive, to evade responsibilities, or to derive gain, feigns illness and voluntarily tries to reproduce signs and symptoms which he really does not have, or extravagantly exaggerates minor ones which he has." In its pure form malingering is very rare. Out of 100 cases studied there was but one with outright simulation and only two patients, who, in addition to the hysterical symptoms had some evidence of malingering. The author states, however, that in practically all posttraumatic syn-

dromes there is a tendency to overvaluation of symptoms, to preoccupation with symptoms, to exaggeration of complaints and to a desire to shift responsibility from oneself onto others. Even patients with definite signs of brain injury are apt to show psychogenic coloration of symptoms. Up to a certain point all this may be regarded as almost normal. Malingering invariably occurs when the trauma is slight and the initial symptoms minimal.

2. Traumatic Hysteria—This is the most common sequel of head trauma that is not accompanied by gross evidence of organic brain injury. It was present in 56 out of 100 cases. The diagnosis of this condition must be based on one set of negative and one set of positive criteria. There is a history of only minor injury without any evidence of clinical signs of brain injury or cerebral pathological condition on encephalogram. Merely negative evidence, however, is not sufficient and the diagnosis can not be made by exclusion alone. There must also be positive evidence that the trauma called forth psychogenic symptoms, and that there is a hysterical reaction of an individual who has an underlying neurotic personality makeup. The patient makes unconscious use of the trauma to solve personality difficulties. The accident brings to a head a series of inner and outer conflicts which the patient was unable to face squarely or to solve adequately. The trauma precipitates the neurosis, sets in motion the same mental mechanisms as in any other hysteria and serves as a convenient solution of industrial, social, marital, familial or psychosexual conflicts. Litigation and compensation may play some rôle in this condition but they are not of paramount importance.

It is interesting to note that compulsion and obsessional neuroses are never or rarely ever precipitated by head trauma.

3. Concussion or Traumatic Encephalopathy (the two terms are beginning to be used interchangeably)—This occurs in a fairly large percentage of patients suffering trauma to the head. In every case there was a history of more or less prolonged unconsciousness. The symptoms were entirely subjective in all of them and in but few more were there even minimal clinical signs of organic disase of the nervous system. The author emphasizes the fact that concussion is not a simple process and that it consists of

fairly definite pathological changes consequent on trauma to the head, which is accompanied by unconsciousness at the time of the accident. The diagnosis of this condition depends on the history of prolonged unconsciousness, on the presence of "small signs" of neurologic involvement, on the absence of psychogenic causal factors, on the persistence and the severity of symptoms, and on the evidence furnished by encephalogram when other facts are not sufficient to establish a positive diagnosis.

4. Traumatic Neuroses—This is a comparatively uncommon condition. The author made this diagnosis only in 5 out of 100 cases. The author believes that this term traumatic neurosis should not be used synonymously with traumatic hysteria as the two are distinct nosological entities. The clinical syndrome of traumatic neurosis does not differ from hysteria but is not dependent, as far as one can tell, on the unconscious use of the accident to solve difficulties that have nothing to do with the trauma. That is, one is not dealing with a patient who had a neurotic disposition to begin with. These patients are a group of previously well adjusted individuals, who, following a serious threat of life in which there was comparatively mild or even trifling injury to the head, beget a stubborn set of symptoms which are not amenable to suggestive therapy or other forms of psychotherapy. Their condition bears resemblance to some of the war neuroses of soldiers who had been through particularly harrowing experiences, which they subsequently relived in their dreams.

They are a small group of patients without demonstrable cerebral pathologic changes in whom hysterical mechanisms cannot be demonstrated, in whom compensation or litigation does not play a predominant rôle, who are resistive to treatment, and who find it difficult or impossible to return to their occupation at which they sustained the accident.

Ebaugh[24] and Benjamin present the following classification:

I. Traumatic Encephalopathy (traumatic constitution)
   a. Simple type with subjective complaints of headache, vertigo, irritability, fatigue, impairment of memory
   b. With secondary psychogenic symptoms
   c. With malingering

II. Posttraumatic Functional Disorders

a. Posttraumatic hysteria (rarely other psychoneurosis), a true hysteria precipitated by trauma in an individual with an underlying neurotic personality; may be accompanied by malingering.

b. Compensation neurosis—a hysteria in which the wish for compensation plays a leading rôle in the unconscious production of symptoms; may be accompanied by malingering

c. Traumatic neurosis—or terror neurosis; a neurosis usually hysteriform with pronounced anxiety features in which the psychogenic mechanisms differ from those in ordinary hysteria

III. Malingering

Commenting on traumatic neurosis Ebaugh[24] states: (referring to Ebaugh and Benjamin) "In common with Straus and Savitsky and Wechsler they reserve the term traumatic neurosis for a specific and infrequent syndrome first described by Horn under the name of Schtreckneurose . . . It is typical that it occurs only following a serious threat to life in such a situation that the patient has time to be aware of and terrorized by the impending disaster, accordingly it is frequent in war and earthquakes, and is seen occasionally in mining catastrophes and sea disorders, but almost never in the ordinary industrial and automobile accidents. Clinically the symptoms are usually those of an anxiety state, with particularly characteristic dreams in which the patient relives the traumatic situation. Unless complicated by secondary hysterical symptoms the condition tends to clear up spontaneously." Wechsler's opinion on the prognosis of traumatic neurosis appears to be somewhat different. He implies that these cases are "resistive to treatment and find it difficult or impossible to return to their occupation at which they sustained the accident."

Mental Symptoms in Head Injuries in Children

Mental changes resulting from head injuries in children have been recorded by several authors.

Strecker and Ebaugh[28] in 1924 reported a study of 30 children with posttraumatic behavior disorders. One-half of these were classified as traumatic constitution and the other half as traumatic defect conditions. The authors state that the behavior disorders bear a marked similarity to those common after acute epidemic encephalitis in children. They further note: "As in encephalitis, we also find in the posttraumatic group that the mental reaction may often represent an accumulation of the previous personality makeup."

Kasanin[29] in 1929, reviewing the histories of 120 children who were observed at the Judge Baker Foundation and whose condition was diagnosed as psychopathic personalities, found that 13 of these cases had serious cerebral injuries, either a skull fracture or some concussion of the brain. He also compared the conduct disorder in these cases to that of epidemic encephalitis.

Beekman[30] in 1928 presented a review of 234 cases of children under 13 years admitted to a hospital over a period of five years and who were followed up at the out-patient clinic for from two months to five years. In 19 of these cases there were noted some mental changes which he describes as follows: "In 19 cases the mother complained that the child's behavior had changed since the injury. In many of these this fact was confirmed by the children's teachers. The severity of this change in behavior varied from mild emotional symptoms—"nervousness," attacks of crying for no apparent cause or a slight irritability—to a change in character, when the child became sullen, quarrelsome and incorrigible. In two of the cases, the patients, boys, had to finally be committed to public institutions. In the examination of the more severe types, the children were sullen and non-communicable, and were frequently caught in misstatements. In most of these cases there had been definite injury to brain tissue. In all but three the base of the skull had been fractured. In two cases the original injury had been classified as mild, nine as moderate, and eight as grave. Ten children recovered entirely, six were much improved, but in three no changes were noted."

More recently Blau[31] has presented a detailed study of 22 cases

of mental disorders following head injury in children. He grouped the cases according to the following classifications:

1. *Posttraumatic Acute Psychoses*—Within a period of 10 years, six of such cases were admitted to the psychiatric division of the Bellevue Hospital. "In this group are included cases of head trauma in which mental changes occur soon after injury, as a rule immediately after the recovery of consciousness." All the children had severe head injuries resulting in coma.

"The mental picture in the six cases was characterized by acute excitement, with marked impulsiveness and restlessness. The patients were noisy, cried and yelled continually, made constant demands on the nursing staff and could not be satisfied. Their symptoms appeared to be merely severe behavior problems, since consciousness was usually clear, contact was good and when attention was held one could even reason with the patient to obtain a promise for more cooperation. Indeed, the first impression was that these were the reactions of previously poorly trained children . . . On closer study it became evident that these patients exhibited a behavior which was impulsive, involuntary and beyond their control. They seemed to lack ability to exercise any form of self-restraint. One sensed a powerful loss of the faculty of inhibition. At one moment they sincerely promised and attempted self-control, but at the next they again manifested every form of infantile behavior to secure more attention. Throughout the psychosis, the outstanding affective manifestations were those of irritability and fear . . . At no time the children showed any hallucinatory or confabulatory tendencies . . . All were amnesic for the accident and the events leading to it but otherwise showed fair memory. They were able to recognize parents, physicians and attendants and readily recalled facts in their personal history. All showed a complete lack of insight into the illness, manifested by many attempts to get out of bed and repeated requests to be sent home.

In five cases the psychosis took an unremittent course, varying from 14 to 35 days, in which constant sedation was required. When the condition began to improve the children recovered rapidly, usually in a few days. The previous normal personalities were then

revealed, and they were found to be pleasant and cooperative, exhibiting a distinct contrast to the psychotic behavior."

2. *Posttraumatic Chronic Behavior Disorders*—"The onset of mental change was first noticed shortly after convalescence from the acute injury. The age at the time of the initial trauma varied from 3 to 10 years." The ages of admission to the psychiatric ward were considerably greater, varying from 7 to 14. None of the patients showed signs of focal disease of the central nervous system.

"The essential characteristic of the syndrome was a complete reversal of personality from that of the previously normal child to that of one who was asocial, unmanageable and unyielding to any form of training."

"Among the outstanding features in these cases are the changes in behavior, with such characteristics as over-activity, restlessness, destructiveness, impulsiveness, assaultiveness, cruelty to animals, emotional instability, temper tantrums, truancy and delinquency. The prognosis in most cases was poor and in only a few instances was improvement noted."

"The mental picture in these patients who had undergone trauma was similar to that often noted in children after epidemic encephalitis."

3. *Posttraumatic Epilepsy and Secondary Deterioration.*—The author states that it is usually believed that injuries to the brain are more likely to lead to epilepsy in children than in adults. However, no statistical study has been made of the exact relation of head trauma to epilepsy in childhood.

"Posttraumatic epilepsy occurred in five cases . . . The first convulsive seizures appeared within a few months to a year after the trauma" . . . "The mental symptoms shown in these cases were similar to the standard descriptions of the epileptic character or personality. These symptoms include egocentricity, sensitiveness, loss of interest, moodiness, irritability, and impulsive assaultiveness with outbursts of rage, particularly before the seizures. One patient showed occasional epileptic equivalents in the form of fugue states during which he wandered away from home." Rapid progressive intellectual deterioration was noted in two cases.

4. *Posttraumatic Cerebral Defect Conditions and Secondary Intellectual Deteriorations*—The author states that many writers remarked on the surprisingly small number of mentally defective persons in whom the deficiency could be attributed to head injury. There are, of course, cases in which the lesion is so severe that idiocy or imbecility is inevitable but such cases are rare because extensive injury to the brain is usually fatal. He concluded that mental deficiency is a rare sequel of head trauma although a form of secondary intellectual deterioration may occur as a result of a lack of interest and attention and of easy fatigability.

Diagnosis

To determine whether the remote symptoms following a head trama are dependent on structural neural injury, Kennedy and S. B. Wortis[32] offer the following criteria:

Absolute criteria:

1. Roentgen evidence of skull fracture
2. Bloody spinal fluid
3. Bleeding or cerebrospinal fluid leakage from orifices, especially from the ears
4. Focal cerebral palsies

Presumptive criteria in the order of their importance:

5. Convulsive states, proved posttraumatic
6. Ventricular distortion, proved posttraumatic
7. History of prolonged unconsciousness
8. History of adequate trauma

"All these units are really measurable and are instrumental in establishing the fact of brain injury." "If other symptoms such as headache, dizziness, for example are ununited to any of the above criteria, there is very little likelihood that the symptoms are a result of structural neural change, but are rather neurotic in character."

It is well agreed upon by most of the observers that the gravity of the head injury is not necessarily directly proportional to the severity of the blow or the extent of the skull damage, but is

rather dependent upon the extent of injury to the meninges, the cerebral and meningeal vessels or the cerebral nerves. This fact was strikingly illustrated by a report by Globus[33] of a case of a boy 17 years of age who met with what was considered a minor accident: He struck his head on a cross beam in a barn. He was dazed for a moment and experienced slight pain. For about two months he remained apparently well except for an occasional headache and vomiting. He attended school and participated in games and other activities. Later the symptoms became more pronounced, however, and at an operation there was found an extensive subdural hemorrhage.

Straus and Savitsky[1] maintain that unconsciousness does not always follow a severe brain injury. They assume that unconsciousness occurs when the blow happens to affect those parts of the brain concerned with the maintenance of waking states. "Other parts of the brain may be jarred only enough to give rise to an almost imperceptible obnubilation of consciousness or no disturbance at all." The authors state that it has been observed that injuries to the occipital part of the head result in unconsciousness more often than do blows to more anterior parts. The authors quote a report of a case by Mossier in which the only result of a blow to the temporal region was an intense olfactory experience without any loss of consciousness, and also a case reported by Koopman of a girl 11 years who died after being struck on the head by a snow ball without any loss of consciousness. The cause of death was deep intracerebral hemorrhage. Several other observers report serious head injuries which were not associated with loss of consciousness.

On the relation of unconsciousness to head injury Glaser and Shafer[9] comment:

"The period of unconsciousness was in no way directly related to the type of skull injury. However, the patient without skull fracture was less likely to be rendered unconscious than the one with skull fracture. The period of unconsciousness was in no way related to the appearance of symptoms or signs, as headaches, dizziness, and the like would develop in a patient who was not unconscious as often as in the patient who lost consciousness. How-

ever, there was evident some general relationship between the existence of unconsciousness and the duration of symptoms or signs."

The important rôle played by pretraumatic personality, which may color an organic syndrome or become fertile soil for minor changes in personality, following a trauma, was emphasized by Meyer[4] in his classical paper mentioned above and more recently in a discussion of Osnato's paper. The same opinion has been reiterated by Hadley and many other authors. Hadley[18] states: "The diversity of the clinical symptoms presented in cases of alleged traumatic origin are such that a cross section will not suffice. One must have some reliable data from a longitudinal viewpoint of a patient's career if one is adequately to understand the phenomena, show that certain changes have taken place, or appreciate the subtle and gross alterations in mental character, and personality makeup of the individual." Gordon[22] has very well demonstrated the importance of a thorough investigation of the early history of the patient before evaluating the significance of a trauma in the psychiatric syndrome.

Straus and Savitsky[1] make a plea for a searching and exhaustive neurological and psychological examination before an organic basis of a symptom complex simulating a psychoneurosis is ruled out and the clinical picture is ascribed primarily to psychogenic origin.

To divert into the field of neurology for a moment, some of the minor neurological signs quoted by Straus and Savitsky are presented.

"Mann recently enumerated the following neurological signs which are indicative of brain damage: difficulty in lateral conjugate gaze, a slight tendency to fall to one side, diminished corneal reflexes, and slight disorders in coordinated movements. Goldstein urged that more attention be paid to the investigation of cerebellar signs and symptoms in patients with gunshot wounds of the head. He indicated that mild involvement of cerebellar pathways is frequently overlooked and that the patients are considered neurotic. Residual of aphasia may easily be missed and unless the condition is thought of, mild forms of sensory agnosia may be overlooked. Schilder and Stengel pointed out the importance of pain asymbolia. Changes in tonus limited to one limb, slight postural defects, defec-

tive associated movements, convergence reactions and other less striking manifestations of disease of the basal ganglia are sometimes not noted during the usual neurologic examination."

"Kino recently pointed out the importance of the depression of the tendon reflexes after head injuries."

"Katzenstein discussed transitory changes in the shape of the pupils following head injury."

On the psychological side the authors state that the usual psychiatric examination is incomplete and will detect only the most evident defects. A careful study should be undertaken of the nature of the intellectual process, the quality of the sensory experiences and the states of volitional tendencies. In more obscure cases the authors suggest resort to more specialized psychological examination, which requires special training. Ebaugh[24] supports the authors in their plea for a thorough neurological examination. He adds that Rorschach may be of great value in cases where the differential diagnosis between encephalopathy and the functional syndrome is particularly difficult.

Straus and Savitsky[1] further state: "The day has passed when the neuropsychiatrist can ask the injured person a few questions and as a result of a brief interview form an opinion as to the intactness of all the psychologic processes, the patient's adaptive capacity and his personality makeup. A more careful analysis, utilizing if possible these psychologic methods, is advised for doubtful cases."

Too much emphasis has been placed in the past on the necessity for the presence of intellectual defects in cases of organic disease of the brain. The experience with encephalitis has been striking in this respect. The defect may be largely limited to the affective sphere. There may be no difficulty in solving simple arithmetical problems, but there may be impairment of the sense or inability to evaluate ethical and social problems, lack of earnest relation to reality, loss of interest and initiative and other defects in the volitional processes. Bush called attention to the defective adaptive capacity of those with head injuries; an inability to alter readily the tempo and rate of work. All these disorders of the mental life may be due to injury to neural pathways and centers, though the

defects are occasionally noted in psychogenic disease. Some of them are perhaps a result, as Friedmann has noted, of inability to mobilize psychic energy."

Discriminate use of encephalography as a diagnostic aid of brain damage is agreed upon by most neurologists. The indications for this procedure in every case, however, is questioned by some. Attention should be called here to a plea made by Sands[25] for a competent neurological examinations and recording of the findings as soon after the head injury as the patient's condition permits. Such records are of great importance in evaluation of later symptoms.

Incidence

As to the incidence of mental symptoms associated with head injury the writer was unable to find any reports of extensive statistical studies of this phase of the subject. The report of the U. S. Department of Commerce on the patients in all hospitals for mental diseases for 1936 indicates that traumatic psychosis represents 0.6 per cent of all admissions. Approximately the same percentage is reported from individual hospitals for a period of a number of years. This percentage does not tell the whole story. As was noted by Cheney[34]: "A large number of cases with acute mental symptoms immediately following the head injuries are treated in general hospitals and never reach mental hospitals." Besides, a large number of cases with minor sequelae are ambulatory and are treated at the physician's office.

The Department of Commerce had no information on the annual incidence of head injuries. Therefore, the above data do not throw any light on the number of cases with head injury which develop mental symptoms. There are, however, a few reports on small groups in which the incidence of mental symptoms per given number of head injuries is recorded.

Frazier and Ingham[35] on the basis of observation of 200 cases with gunshot wounds at a veterans hospital state that "psychoneurosis as an element in the symptomatology of this series was comparatively unimportant. With three or four exceptions anxiety, and neurasthenic symptoms were present only to a degree commen-

surate with the nature of the injury. Conversion hysteria was not encountered in any of the cases." Only four cases developed serious mental symptoms in the form of terminal deterioration. All of these cases had penetrating wounds involving both hemispheres. On the other hand, of the many patients with unilateral frontal lesions, some of them extensive, none showed characteristic psychic symptoms.

Earley[36] made a study of 100 patients who suffered their injuries from 5 to 13 years prior to the followup examinations. He found that among these 100 cases 19 had headaches that were severe and frequent enough for the patient to attribute them to the head injury. Fifteen had vertigo, which was brought on by movement of the head. Seven had defective memory. In three, a traumatic psychosis developed. In four, personality changes have developed.

Stone and Brams[37] who made a followup study of 54 cases of definite head injuries from 6 to 18 months after the injury, report that three of these cases developed traumatic psychosis, two of the patients recovered within two months after the injury, while one was confined to an institution eight months after the injury; three other cases developed emotional changes as follows: one had a paranoid trend; one bit his tongue and ground his teeth; and one showed increased irritability and excitability. Headache persisted in 10 patients.

Glaser and Shafer in a series of 255 cases of head trauma found mental changes, "consisting of disorders of the mental faculties with changes in character and habits, and associated with unreasonable and purposeless action and language," in 24 cases or 9 per cent of the whole series. "Mental changes predominate in fractures of the base, whereas they occurred to a lesser degree in those cases without fracture and in those with fracture of the vault." They also found that mental changes may manifest themselves at a period later than three months after injury. Beekman in review of 234 cases of head injuries in children under 13 years admitted to a hospital over a period of five years and followed up from two months to five years, found that in 19 of these cases there were noted some mental changes.

Prognosis

Russell reporting on his analysis of records of 200 patients with head injuries who were reexamined at an average interval of 18 months after they were examined during the acute stage notes the following:

1. Of 139 working men and women, 79 per cent had been able to return to their full work within six months of the accident.

2. The duration of convalescence is in direct proportion to the age of the patient. In the later age group there is a greater tendency of symptoms to persist, that is the power of recovery from postconcussional symptoms is less in this group.

3. Six per cent of 15 to 30 years were unable to do full work 18 months after the injury, 21 per cent of 30 to 50 years were still fully or partially incapacitated at this interval, while the corresponding figure for patients over 50 was 46 per cent.

Of 110 men and women under 40 years with severe head injuries only seven had not returned to full work 18 months after the injury.

From his observations Russell concludes that the most important single factor which influences the ultimate prognosis in a case of head injury is the age of the patient. The severity of the injury, as indicated by the duration of unconsciousness, is of some importance, while the presence or absence of fracture of the skull is of least significance.

Glaser and Shafer[9] from their study of 255 cases concluded that the recovery from mental changes, nervousness, visual complaints, fatigue, insomnia, body pains, gastric symptoms and the like usually occurred in the first year and a half. If these symptoms existed beyond a year and a half, recovery rarely occurred. Incidently they assume the latter criterion for all the symptoms and signs of head injury, stating, "if symptoms and signs lasted beyond a year and a half, the prognosis for ultimate recovery was poor."

Of 54 cases studied by Stone and Brams[37] there were 40 complete recoveries, 10 partially recovered and four remained unimproved and totally incapacitated for work.

Bonner and Taylor[39] commenting on prognosis of head injuries conclude from their study of 50 cases admitted to Danvers State Hospital that: "In comparison with the severity of the psychosis shown, the duration of stay in the hospital and subsequent adjustment, both social and economic, is better than might be expected, with the exception of the cases of posttraumatic mental deterioration, which usually require continued hospital care."

Of the 19 children from 234 with head injuries who developed mental symptoms, as reported by Beekman,[30] 10 recovered entirely, six were much improved, only in three no change was noted.

Pathology

It is not the intention of the writer in this review of some of the literature on the psychiatric aspect of head injury to go into any detailed consideration of the pathology of head trauma. A few general remarks, however, may be quoted to round out the presentation.

Sands[25] in his conclusions on anatomical aspects of brain injuries states: "Cerebral and subarachnoid hemorrhage, cerebral edema, and disorganization of the Virchow-Robin lymph system, contribute to brain destruction and degeneration. Posttraumatic sequelae are due to loss of brain tissues, meningocortical adhesions, contraction of scars, collection of fluid in the meninges, and interferences with proper cerebrospinal fluid and lymphatic circulation."

Wechsler[12] justifies a designation "traumatic encephalopathy" by citing the work of several authors, (Martland, Foerster and Penfield, Bielshewski, Rand Courville, and Friedman) who contributed greatly to the knowledge of the anatomic changes underlying this condition, such as "minute hemorrhages, glial changes, cell and fibre degeneration, disturbed cerebrospinal dynamics, ventricular distortion and brain atrophy."

Winkelman and Eckel[40] in a recent report on the clinical and histopathological study of five cases of posttraumatic state varying in time from four months to five years found corroboration of their former study[41] of minor changes in the brain associated with severe brain damage which caused death in days or weeks after the injury.

They classify the changes related to the trauma as:

"1. Those changes that are the direct result of the injury itself. 2. Those changes that are secondary to the injury. 3. Those processes found in the brain associated with the terminal illness.

"The changes which are the direct result of the injury include the damage to the brain at the time of the trauma, including hemorrhages, bruising, lacerations, petechial necroses from commotio cerebri, edema, circulatory and spinal fluid disturbances.

"The changes which are secondary to the injury are those which take place as the result of the original alterations in brain structure and physiology. As results of the circulatory change we could include here the secondary anoxemia with ganglion cell changes and the production of acellular areas. The glial changes, the chronic cell processes and meningeal changes can also be considered as secondary to edema and to the bleeding into the brain and its fluid spaces.

"The changes found in the brain associated with the terminal illness can include everything found at postmortem due to general disease, unrelated to the accident . . .

"Histopathologically the patients showed focal lesions of hemorrhage and softening with scattered petechial lesions of the same sort. The changes in the brain in general were attributed to the original concussion plus the secondary changes due to anoxemia from increased intracranial pressure. These involved the ganglion cells and blood vessels plus a universal glial overgrowth." They also found that adhesions of the pia-arachnoid to the cortex and to the dura were present in nearly all cases.

Treatment

The most important factor in treatment of any after-effect of head injury including the mental symptoms consists in prevention of these symptoms by proper surgical and medical treatment of head injuries at their onset. As Winkelman[12] puts it: "It is not only the trauma, but the handling of the patient afterward that determines what will happen to the brain, the most sensitive organ of the body, an organ that degenerates with the loss of blood supply

in eight minutes and completely degenerates in less than 15, something that physicians are sometime a little late in remembering."

Mock[43] commenting on the same subject states that prevention of sequelae of head injuries depends upon adequate treatment of all head injuries, but especially of those which at first seem to have suffered only slight cerebral damage.

As to the treatment of persistent cerebral disorders Mock, who incidently believes that there are too many cases of old head injuries going about misunderstood and inflicted with diagnoses of hysteria, neurasthenia, compensation neurosis and even malingering, and that the majority of these are definite cases of persistent cerebral contusions, states that the aim in treatment of such cases should consist of relief of the persistent increased intracranial pressure. "Prolonged and continuous rest in bed, purging, intravenous injection of glucose or other hypertonic solutions and even repeated lumbar punctures may be necessary before this can be accomplished."

Penfield[44] has advocated lumbar insufflation as a treatment for chronic posttraumatic headache. Drayton[45] reports very faborably upon the results of treatment of posttraumatic headache, dizziness and change of character by pneumocranium in 100 cases.

Russell[5] is of the opinion that treatment of patients suffering from postconcussional symptoms depends first on accurate diagnosis. The disturbances are usually subjective, and it is necessary to distinguish organic from functional symptoms. The symptoms complained of have to be considered separately in each case. Identical injuries to the head of two individuals may produce quite different after-effects.

Not only must the symptoms be analyzed, but any underlying anxiety should be brought to light, especially in those cases in which the functional element is prominent. Clinical examination, following by simple reassurance, cures many such cases and it is well to explain to the patient that such symptoms are common and will gradually disappear.

He believes that in many cases light work should be provided before full work is attempted while in some cases rest in bed may give quick relief to postconcussional symptoms. Russell also advocates

sedatives such as bromides and luminal in those cases in which irritability and hypersensitiveness to noise are troublesome.

The treatment of "posttraumatic neuroses" outlined by Hall and Mackay,[26] aside from the special features of a prompt settlement of all financial controversy by a lump sum payment, rather than protracted payments, and a prompt reestablishment of the patient in some form of work in which he can effect a transfer of his attentions from himself to outside interests, differs in no way from the treatment employed in the cases of any psychoneurosis.

The point of lump sum settlement, which had been stressed by many authors in the past was contradicted recently by Norcross.[46] After a followup study of many workmen's compensation cases which were closed by a lump sum settlement, he came to the conclusion that the value of a cash award is vastly overrated. "It is the settlement of the case, the actual ending of litigation, which is of value. Whether the final compensation award is paid in one lump or extended through a number of installments made little difference in the claimant's condition." Incidently, Norcross urges that cases be given prompt and careful handling because neurotic conditions grow as cases are delayed.

Conclusion

In conclusion one may say that there are definite clinical entities which can be attributed directly to the head injury. Such are acute traumatic psychoses (deliria), posttraumatic personality disorders and posttraumatic deterioration.

There is another group of cases of mental illness which is occasionally attributed to head trauma. These are the so-called disorders of psychogenic origin and grossly include paranoid conditions, dementia præcox, manic-depressive psychoses. There is a general agreement among the neurologists and psychiatrists, however, that no direct relationship could be established between the head injury and the above mentioned psychoses. If the trauma plays any part in such cases it is only of a secondary precipitating nature and in such event its rôle will not be any different from that played by any other trauma of physical or psychological nature.

There is still another group of mental symptoms associated with

head injury which simulates psychoneuroses with or without minor neurological changes. In such cases frequently it is very difficult to make a definite interpretation. It requires special training, skill and painstaking study of each individual case to determine whether one is dealing with an encephalopathy resulting primarily from the head injury, a reaction which is primarily of psychogenic origin, or whether both factors are playing a part in the reaction. It is in regards to this clinical entity that a great controversy still exists. The rather complex clinical picture is often more complicated by the medicolegal aspect of the situation.

In spite of a sincere attempt of a physician to be purely objective in arriving at a decision in such cases, the "cultural compulsive" of the physician apparently plays an important rôle in the final decision. How else could one explain the contrast between some experts in the field, who criticize the antagonistic attitude of many physicians to the patients, who claim injury from industrial accidents, and plead for a humane attitude to these people; and those who exalt the polo player, who insists on "playing the game" in spite of a serious head injury, while at the same time they point a suspicious finger at the worker, as a man who attempts to "extort" compensation on the basis of apparently minor injuries.

There are no statistical studies available to ascertain the incidence of mental symptoms following head injuries.

On the whole prognosis for recovery from the gross mental symptoms following head injury is rather favorable. In relatively few patients the defects remain permanently. Some authors believe that if the symptoms persist for 18 months the chances for recovery from them are small.

The pathological changes which may result from head injury are those associated directly with the trauma and which consist of damage to the meninges, cerebral vessels or parenchyma, and those secondary to the original damage to the above tissues resulting in loss of brain tissues, meningocortical adhesions, contraction of scars, collection of fluid in the meninges, and interference with proper cerebrospinal fluid and lymphatic circulation.

The most important feature of treatment of the posttraumatic sequelae is their prevention by proper treatment of the head in-

juries at the onset. The persistent headache and dizziness are treated by some by rest and various measures of reduction of intracranial pressure. Some physicians report favorable results from lumbar insufflation of air. The treatment of mental symptoms following head injury does not differ from the treatment of similar psychiatric problems from other causes, except from the medicolegal aspect.

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TECHNICAL APPROACHES USED IN THE STUDY AND TREATMENT OF EMOTIONAL PROBLEMS IN CHILDREN

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PART SIX

Correlation of Facts—Evaluation of Methods

I. *Introductory*

In five previous papers (PSYCHIATRIC QUARTERLY, October, 1936-October, 1937) methods of approach for the study and treatment of emotional problems in children have been described each being considered independently and without specific reference to the totality of psychiatric cases admitted in a typical children's service. An effort will now be made to consider the application of the methods and their relative value as means of study and therapy in a setup such as that of the Psychiatric Institute.

II. *General Routine on Admission*

As carried out at the Psychiatric Institute, the procedure on admission includes the collecting of anamnestic data, physical examination, mental and psychometric examination. These are completed by observations and reports from nurses, school, physical education, and occupational therapy teachers, psychologists, as well as by studies from social workers. The reader is referred to papers by Potter[1, 2, 3] for details concerning the organization and managing of a children's service in a psychiatric hospital.

When the child is first brought to the hospital, an anamnesis is obtained from the mother or the father and eventually from both, as well as from other relatives if indicated. The physical examination is done as soon after admission as possible; with children this is not always obtained as early as with adults. Apart from the acutely psychotic or physically-ill child, delay is justifiable especially since a large proportion of children show anxiety. It is desirable not to associate in the child's mind the physician who will later treat him and who needs to make at the outset a friendly rapport with him, with the physicians who may have been instrumental in causing the child discomfort and fear; and any one familiar with

a child guidance clinic knows that the average child has been submitted to a variety of examinations and treatments prior to his admission to the clinic. In all cases, however, temperature and pulse are taken daily during the first few days. The writer recalls only two cases where even this could not be carried out without arousing anxiety in the child.

The first contact of the physician with the child should be casual rather than in the form of an official interview in the office. One must learn to "waste time" at first, in order to become acquainted with and accepted by the child if one wants to make better use of one's time at a later period. Frequently the psychiatric institution and the physician have been used by the parents as a threat for a long time prior to his admission. The writer recalls one delinquent child whose parents had threatened for several years to send him to a "reformatory" if he was "a bad boy" and who for a long time persisted in the belief that he actually was in a reformatory. For this same reason (previous association by parents of punishment threat and "bad behavior") the physician will be wise not to refer to the problem which led to admission in his first interviews since the child expects him to be the instrument of punishment his parents have threatened him with.

By asking the child about his interests, one may already get a hint as to what method of investigation will be most appropriate. A child may spontaneously refer to his drawings, productions to which parents and teachers have often remained indifferent, and about which they may even have expressed contempt. One such child had managed to keep from view numerous scraps of paper, which he had, in the course of several years, covered with drawings, contemptible productions to others, but priceless to him. His verbal contact showed him to be shy, reticent, and encouraging him to draw proved the most satisfactory means of expression for him. The verbal type of child, on the contrary, may go spontaneously into telling *stories,* the theme of which will immediately reveal his emotional conflict as pointed out in previous articles. After very few interviews, the physician will get a fair idea as to which means is most likely to be productive and adequate for a particular child. One or several of the methods can be adopted, successively, alternately, or together.

III. *Mental Examination*

As expressed by Potter "the mental examination aims to secure an understanding of the child's feelings and attitudes toward various experiences, toward various people who contact his life and toward himself." With the emotionally disturbed child, at least, this cannot be obtained by direct questions such as "How do you get along with your brother or sister?—Do you like your father, your mother?"—since answers to such questions usually fall into several categories: "Nice" answers which the child thinks he is expected to give, deliberate fabrications at variance with anamnestic facts in the record, no answers, or on the contrary, answers expressing a defiant attitude. It is only exceptionally that the child reveals his true, deep emotional attitude in answer to this type of question. The fact hardly needs to be restated since it is demonstrated over and over in children's records, as the latter bring out the contrast between formal answers (states he is fond of both parents, and so forth) and the latent feeling of hostility uncovered and verbalized later in the course of adequate investigation. Several writers, among whom is Potter himself, have pointed to the necessity of avoiding direct questioning in initial interviews. In the process of describing various technical approaches for the study and treatment of emotional problems in children, the writer has stressed that, not only as regards initial interviews, but also the child's spontaneous or stimulated symbolic expression, must direct questioning be avoided. This has been formulated about drawings, but holds true of any other material used.

Another point to be stressed is the attitude of the physician. It is not enough that the latter be sympathetic; a more active *participation* is demanded of him, thus making the child feel that he can go to all extremes of expression, much in the way the adult does in free association. Free association cannot be used with the very young child because of his inability to verbalize, and unrestrained, uncensored psychomotor activity is its equivalent. That the child in general expects participation from his environment can be noted by those observing him at play alone or with others, and it depends on the physician's attitude whether the child will incorporate him in his field of activity and expression. It is not always

easy to watch a child chew or suck on clay, and even occasionally to be asked to do the same, to let him rub saliva on various objects, including the observer's own belongings, et cetera, but a child who indulges in such activities strives to express something, and it is the reason for and the meaning of this activity that matters. In the whole setup, only the physician can give the child a chance for such expression and the release therefrom. This writer recalls a four-year-old girl who was admitted with multiple compulsions, negativism, assaultiveness toward other children, regressive behavior in the form of wetting, soiling, smearing, as well as a much regressed and in part unintelligible speech, all symptoms of recent development. The mother, who is aggressive, oversolicitous and shows compulsive traits herself, has, in her handling of the patient, made use of the concept "bad-good girl" to such ends that the child's whole behavior and mental reactions are pathologically determined by it. The words "bad girl" recur so frequently in her spontaneous utterances that no analysis is needed to establish the relation between her fears, aggressiveness, compulsive behavior and a strong sense of guilt, whatever the reason for the latter may be. In the playroom, this child spent her time doing only one thing: spitting in objects, preferably containers such as nursing bottles, dishes, or toys with holes, sucking back some of the saliva and redistributing it in other articles. She did this with evident pleasure, chuckling, suddenly raising her shoulders as she giggled, et cetera, but with her back turned to the physician and from time to time glancing over her shoulder with a fearful expression, the whole while not saying a word. The physician addressed her smilingly, since this reflected the child's mood: "Having a good time? Such fun, et cetera," to which she nevertheless answered at first only by protective movements of arms and back. It was not until after several such sessions, that she began to talk to the physician as she performed openly before the latter, smiling at her from time to time, coming over to snuggle against her. There is no need of going into the releasing mechanisms at work in order to explain the affective bond thus created between physician and patient, which in this particular case appears to be the only affective contact the child has with the reality world. The change in her af-

fective attitude is exemplified by two spontaneous remarks made to and about physician, the first on (re) admission, the second six weeks later, as follows: "You are a pest that is a pest is a thing a new thing"—"She is my one." This is the more important since in a psychiatric hospital, the function of all other adults, however sympathetic and individualized their attitude may be, is such as to preclude the release of such impulses which run counter to necessary routines and discipline.

IV. *The Physician's Attitude and Rôle*

Throughout the child's stay at the hospital his relation to the physician is determined by the nature and severity of his problem and the physician's attitude toward it. Consistency of attitude is fundamental. The therapist cannot afford to jeopardize his contact by hovering between two opposite rôles: that of the disciplinarian, and that of the good, understanding parent-surrogate. It is true that frequently the child himself makes attempts to bring him into the position of the punishing parent, in an unconscious effort to reproduce an earlier situation. While this cannot be avoided and indeed must be faced, a consistent attitude alone can give the child that emotional security toward which he ultimately strives.

The situation in which "disciplinary" measures and decisions must be taken can be conveniently, if somewhat artificially, divided into two types: First, those related to the general order and organization of the service (observance of hours, care of room and clothes, adjustment to group activities, and so forth), second, those directly related to the personal problem (attacks upon other children, homosexual activities, refusal to go to school, desire to secure permission for home weekends, to obtain "neighborhood" or other privileges in keeping with the degree and nature of improvement, and others). The former are dealt with by the head nurse and her assistants, the latter by the physician. It is those situations that the physician can handle in such a way as to make the child share, if not assume, the responsibility of decisions. Thus, the mechanism of identification so frequently noted by educators and child observers is once again called into operation. As expressed by S. Isaacs[4]: "One of the striking things, in view of the

age of the children, is the readiness with which they respond to the adult's appeal to this mechanism of identification." In this instance, Susan Isaacs refers to identification with other children; the same holds true for identification with adults. It is indeed a striking thing that a child may come to his physician in great agitation or rage, demanding a privilege which he thinks is due him and soon quiet down and decide himself that he should not be granted this privilege by the use of such simple questions as: "Why do you think you came here, to this kind of hospital? Why do you think a child who gets upset at his home stays with us at the hospital? If you were the doctor, would you think that he could go home so soon, and not get upset again?, etc.—or by mirror questions such as "What do you think? . . . Think about it . . . Tell me yourself," in answer to the child's own questions. Such an attitude presents other features: it alleviates the fear of punishment by displacing the power to "punish" from one agent to another, thereby making possible a better affective relation between physician and patient; it also helps the child gain insight into his own emotional reactions.

A third type of situation warrants mention here because of its relation to psychological as well as physical therapy, namely situations where hydrotherapy (in the form of packs or prolonged baths) needs to be prescribed because of marked restlessness or excitability. They are referred to as "water treatments" and never applied without such information given to the child. Incidentally, it is difficult to deal with the fear associated with such hydrotherapy, and it is not infrequently that a child persists in the belief that it represents some form of punishment, possibly due to the attitude of the other children toward it.

V. *Consistency in Findings*

In previous papers, references have been made about the child's "theme" as revealed by individual methods. Viewing methods in their totality, one is impressed by the fact that for any given child, findings are consistent, whether one or another method is applied. This is clearly brought out by the productions, reported in part, (PSYCHIATRIC QUARTERLY, Oct., '36-Jan., '37) of Harriet, a girl 12

years, 10 months on admission whose emotional conflict is crystallized around the sibling rivalry motive. There was especially the jealousy associated with breast feeding of the baby brother, first expressed indirectly and symbolically, then brought out as a conscious memory later in the course of investigation. In her drawings and her modelling, Harriet represented her mother's breasts, nursing bottle (on which she was seen accidentally to chew and suck) and her stories expressed clearly the hostility toward her brother. Her other motives, such as hostility toward mother, can be followed in the various media used. The same can be observed with all children, to a greater or lesser degree of consistency, but is very striking in a case, known to the writer, of a boy, youngest of two boys in an American-Jewish family, 9 years, 1 month, a severely progressive feeding problem, which began after weaning at four months: vomiting, food fads, lack of appetite, and dawdling which "makes it impossible" for mother to be away "even an hour." Gradually, the feeding problem has been further complicated by the pathological affective tie to the mother who herself is very ambivalent (has verbalized wish for his death in his presence and directly to him, but also states that she fears "he will eventually be an invalid, he might die. I'd rather die myself . . . I am so miserable the days he vomits.") It is impossible to describe in brief the many-facetted pathological attitude of this mother which includes watching the child as he plays outside with other boys, calling him in to take his temperature if he is seen running, and having him sit immobile until his temperature has become "normal," weighing the boy before and after use of the bathroom and "making up" for the loss with milk and cake, preparing two portions of food for each of his meals, the second to be used in case the first is vomited, etc. The boy has many fears, cannot go into the dark without mother, nor attend a film performance or football game (his older brother very active on his high school football team) without getting upset and vomiting. Innumerable diets and treatments, including herniotomy and appendectomy, have been carried out. Despite the developmental history as given, physical status is normal, even weight being within normal limits. Intelligence superior. This boy's theme is reproduced with exact

faithfulness in all the media used by him: stories and "plays" which he has offered to write, clay compositions, choice of toys and games. The theme deals with the hostility toward the older brother ("a wonderful boy, an endless source of joy" to whom the mother constantly compares him) by removing him altogether from various spontaneous expressions: in clay, in drawings, in word and dramatic forms, he tells the story of a boy of his own age named Billy whose companion is a younger sister, Betty, and whose chief concerns are: 1. to become a great football player, and, 2. to absorb food between games. Milk and cake, factors of contention in his reality world, appear with undue frequency. Incidentally, he did not at first acknowledge fears, and spontaneously stated his own problem as being "not eating so well because I am sick."

It is this consistency of findings by means of different media, and in the face of a lack of conscious motives, which points to the value of such methods as means of investigation.

VI. *How the Study Is Completed.*

Investigation of causes for and treatment of conflicts by such methods as have been described are based on the conviction that the actual behavior and affective expression (whether direct, indirect or symbolic) of the child are determined by his past experience, including psychic traumata. In the light of such conviction in a strict determinism, every gesture, every utterance, every spontaneous or outwardly stimulated reaction has a meaning which must become clear when all the links in the past experience are known. The foremost question in one's mind when observing and studying a child is therefore: "Why—why this gesture?—why this symbolic drawing? etc." While the explanation may at first be wanting, and may even never become known, such an explanation is to be sought.

Outside of the doctor's office, information is gathered by several agencies enumerated above, which complements that obtained by the physician directly from parents and child. Three of these agencies are of special importance and warrant further elaboration.

A. *Nursing staff:* From the special point of view now being considered, the nurse plays two complex rôles: that of parent-surrogate, that of dispassionate observer. In the latter capacity, he or she observes and records the personal habits of the child: care of self, clothes and other belongings, toilet habits, sleeping, eating, and thus provides important information as regards, not only the end-result of early home training, but also the various manifestations of regressive behavior, such as soiling, wetting, smearing in a previously trained child, regressive speech (baby talk, et cetera) and the particular circumstances, if any, in which they occur. Observations of activities are also recorded, as well as the affective reactions to those in the hospital environment; thus, the adjustment to other children (noting the sex and age) will often illuminate an unclear sibling relationship; the attitude toward male and female nurses (noting sex, also, roughly, the age range and type of personality, and whether child is spontaneously affectionate or antagonistic toward the adults about whom the observation is made) is also of great informative value. Reactions to interviews with the physician need also be recorded.

B. *Social service:* All cases on the children's service are assigned for social service workup, for children, as growing and rapidly evolving beings, are much more dependent on their environment than are adults. Therefore studying, and, if needed and possible, changing environmental influences and parents' personalities is an indicated goal. The mere comparison between anamnestic data obtained on admission even from ideally cooperative parents, and the data collected several months later points to the value of this agency, from our special point of view. Information obtained at first is not only incomplete, it is often inaccurate as well, the general tendency being first to present the problem as recent, well localized, and referable to some specific cause within the child himself, or to some well-defined outside cause (accident, operation, et cetera) then, as the months of hospitalization go by, to recall more and more instances of anomalous behavior, which throw the onset of the problem further back, or show the latter not to be so unilateral as it appeared. As parents talk their lives out and become involved in spontaneous or stimulated reflections upon their

relationship to the patient, they usually become relieved of the feeling of guilt which had made them unconsciously seek a (to them) more acceptable conception of the child's difficulties. Furthermore, his removal from the home has relieved the general feeling of tension caused by his abnormal behavior. While it is true that there are occasional parents with whom the reverse is true (usually when the child shows no improvement and they begin to realize that he may require indefinite hospitalization), as a rule the relief of parents' anxiety helps them gain a more objective view of the developmental facts.

C. *School teacher:* Most children while at the hospital attend school. Their group is smaller than any public school group and the teacher is especially fitted for the complex function of bringing out each personality with the minimum friction possible, and with the maximum individual expression and group adaptation. The affective relation established between child and teacher is of interest in the light of the child-parent surrogate relation. The teacher also observes and records the relation to the other children. Here, more than on the ward, the competitive factor plays a part and opportunities for the play of the sibling rivalry motive are more numerous. From an experimental point of view, the school offers a field for comparative studies, as was reported in the first paper of this series, an observation which further emphasizes the necessity of the physician's attitude and rôle as defined here.

VII. *Correlation of Facts*

Through the several agencies named, numerous facts, as facts, are systematically collected. Before an adequate interpretation of the facts is arrived at, correlation between them must be achieved, with their *time relation* clearly established. Such correlation requires a constant shuttling back and forth between synthetic and analytic thinking. It requires bringing in close parallel, for frequent revision, anamnestic data, child productions, further social service information, further nurses' and teachers' observations.

Frequently, it is the child's utterances that throw a light on situations either obscure or not yet brought out in the anamnesis:

through one boy's drawings it is learned that he has been tied in the cellar and beaten by his parents, through another's elaborations of his clay productions, a possibly psychotic feature appears in the mother's personality structure (auditory hallucinations following maternal grandfather's death?) A third child, a girl, totally unproductive through graphic and plastic media, brings out numerous "forgotten" memories and interesting points of information about personalities in the family background, points that were withheld, consciously or not, by parents and which provide the key to an understanding of the parents themselves. While, insofar as the child himself is concerned, it is relatively indifferent whether such experiences are actual or phantasied, since in either case they are very real to him, on the other hand, it is of interest to check on them because their omission represents something significant in the parents' personality. This can and should be done without revealing the child's statements as this would be detrimental to the child-physician affective relation, would cause anxiety to the parents and might create resentment on their part toward the child. Such situations are usually handled by closer questioning regarding the period under scrutiny. Incidentally, this gives the parents an opportunity to gain insight into their own motivation.

The linking of all agencies of information aims to achieve a unity of conception which is valuable from two points of view: (a) the scientific (study of etiological factors—accumulation of clinical data for further investigations—study of therapeutic approaches); (b) the practical (question of adjustment in the home and social group—of possible changes in the environment—economy of time and means). There is no need to emphasize that correlation of all facts, including material brought out by the child can help in arriving at an early diagnosis, the practical importance of which can readily be seen. Segregation of patients for adequate treatment and training can thus be instituted at an earlier stage (especially as regards certain classes, such as delinquents, epileptics, feebleminded, etc., for which special opportunities are offered).

VIII. *Complexity of Factors*

Even in this brief presentation of the subject, the complexity of factors involved in the study and therapy of children's emotional problems is apparent, though, under hospital as against private practice or out-patient clinic conditions, it is much reduced: in evaluating the behavior and emotional reactions of the child, the psychiatrist has the advantage of a situation the operative factors of which are relatively controlled, including that of personalities surrounding the child. Furthermore, the latter is under 24-hour observation in a setup from which parents, as additional instruments of conflict and confusion, and the usual frictions with the average social group are spared the patient.

Notwithstanding these simplified conditions, the problem remains complex, owing to its very nature: comparing the adult with the child patient, one finds the latter not so well crystallized in a definite behavior and emotional pattern, the boundaries between the permanent and the transitory are not so well demarcated, so that for instance one child may present a history of severe temper tantrums so severe as to appear a bad prognostic sign and yet shortly outlived, while another starting with mild behavior anomalies such as may even be observed in the normally developing child, progresses toward a more chronic and profound disorder. Furthermore, criteria for the "normal children" are not well defined, especially with the youngest ones, whether one considers motor activity, distractibility, span and intensity of phantasy life, span of purely egocentric interests, span of infantile habits, later to reappear (or to have persisted) in the neurotic. Information regarding these criteria is not so reliable as where the mature individual is concerned, if one judges from the variability of data coming from different sources. Lastly, the child's means of spontaneous expression are fewer and less comprehensible (to us) than is the case with the adult, wherefrom the paucity of direct material thus far obtained about mental diseases in children. In passing, organic factors which are deliberately left out of consideration in this writing, are an added element of complexity.

IX. *What Is to Be Attributed to Therapeutic Procedure*

If a systematic study of non-selected child cases, taking into consideration etiology, diagnosis, systematic therapy, course in relation to this therapy or the absence of it; if such a study has been made, it is not known to this writer.

Before considering the matter of evaluation of methods as specific therapeutic agents, some observations must be reported: nearly all children improve spontaneously during the first weeks after admission, the few exceptions being found among the progressively severe psychoses, or those cases with organic disease, such as postencephalitics or epileptics, though even among the latter the improvement just reported may be noted. The following reasons are given as possible explanations for this general finding.

(a) Removal from stimulating influences (neurotic or psychotic personality of parents—sibling rivalry—pathological attachment to one parent—conflict in the school situation). With some cases, this may go so far as to show an almost complete absence of the symptoms described on admission: a child described as assaultive, negativistic in his family or at school seems to be gentle, affectionate and adaptable, etc.

(b) The fact that children find themselves in a special setup where not only factors for pathological stimulation are absent, but also where a regular schedule for diversified and well planned occupations is observed, where aim of adults is consistent and impartial, and adults are emotionally mature.

(c) A very important aspect is that each child feels that he is with children more like him than the people who have contacted him prior to admission, since his experience has then been that of the exceptional child (either blacksheep or pet in the family). Whereas, he has been contrasted with the other children, either in his family or outside, now he finds himself similar to others. Children express this feeling in a variety of ways, but with the same spontaneity and intensity. This affords a considerable release of tension.

(d) The possibility of affective attachment to physician in charge, representative of the good parent-surrogate, and this irrespective of whether or not he has instituted systematic therapy.

This relationship is spontaneously expressed by some children who may for instance ask why the physician could not be his father or mother instead of his "real" one?

(e) Even when visits by relatives are permitted, the parents themselves may be relieved enough by removal of child so that casual relation is made easier—incidentally, this apparent improvement may cause difficulties with parents who believe the child so much better, "cured," that he might return home.

This initial improvement at hospital, whether or not specific therapy is instituted, makes it impossible to draw conclusions from the application of any therapeutic method on a short term basis.

X. *How a Given Method Could Be Evaluated*

Even under the best conditions, it is difficult to obtain an accurate estimation of any given method as regard its therapeutic value, since other factors are always operating, which cannot be isolated, and the nature and rôle of which are not clearly defined. The ideal way would be to divide all cases in the same setup into (a) treated, (b) nontreated, all other factors than therapy being equal. The latter, however, can hardly be realized, since, together with other less obscure elemnts such as chronological and mental ages, social status, chronological relation to siblings, etc., it involves putting in parallel similarity of diagnosis and etiological and hereditary factors, etc., in both series. The relatively small number of cases admitted per year (55 to 60) makes it also difficult to achieve this classification, and finally, the function of the children's service as a teaching unit makes the relatively rapid change of therapists compulsory.

Failing to obtain ideal conditions, other means of and opportunities for estimation must be used which the service, as set, provides: for instance, if introduction of or changes in therapeutic approaches bring chronologically related changes in insight, behavior manifestations, or productivity, we are justified in assuming that the latter changes are determined by the former, provided other factors remain unchanged. This takes place in special situations when, through unavoidable circumstances, there is a change of physicians in charge, or cases remain unassigned for variable periods of time.

Another means of estimation, especially with regard to personality studies, rather than therapy, would be found in comparative studies, by the same techniques, of children with behavior or neurotic problems (with similar CA, MA, social status, etc.) of children described as "normal" by accepted standards of normalcy, ill-defined though these may be. David Levy has opened the path in the latter direction with his studies on sibling rivalry and finger sucking and accessory movements referred to previously.

XI. *Essai of Classification of Severity of Problems*

Improvement may be temporary (relative) or permanent, when absolute causes for conflict are found and the conflict can be worked out. Whether the latter obtains is ascertainable by case followup under continued, relatively controlled conditions. At the Psychiatric Institute, long term therapy is possible, and prevalent, and, when incompletely carried out, it is due to lack of cooperation on the part of parents. It is therefore possible in the majority of cases to get some estimate of the nature and duration of improvement as well as to analyze conditions under which failures take place.

The most amenable cases seem to be those where the emotional problem is well localized to within the family, in the absence of marked or prolonged personality disturbances, or neurotic symptoms, even when the behavior disorder as manifested in the home is severe. Such are the problems of assaultiveness toward and incompatibility with siblings, aggressive or overaffectionate attitude toward one or other parent, also most of the habit and feeding problems in young children, which are closely determined by the parent-child relation. When the problem represents clearly a direct transfer of pathological affective relation in the family to another social group, such as behavior disorder at school, assaultiveness toward other children or teacher, it seems also more readily amenable. Lastly, neurotic problems where anxiety is a prominent symptom, in the absence of perceptual disturbances, hypochondriacal complaints or somatic delusions.

On the other hand, the most severe fall roughly into the following categories:

1. Cases where definite psychotic symptoms are observed.

2. Cases where organic factors are prominent, irrespective of whether the neurotic or behavior disorder is mild.

3. Cases where the capacity for affective attachment is markedly reduced. This attains not only in psychotic children, but also in personality disorders where lack of affect is a characteristic feature.

4. Cases were severe compulsions are present.

5. Disorders representing a spread to the social group in the form of antisocial behavior, and different in extent and nature from the direct transfer of pathological affective familial relations. To these belong the delinquencies which, in the writer's experience, are the most irreducible. In addition, these children come late to the attention of the psychiatrist, and with a long history of progressive personality problems, which may account for the difficulty encountered.

6. All other factors being equal, a low I. Q. is an added liability, not only from the point of view of investigation, but also that of future adjustment, which requires special school and trade training in addition to emotional adjustment.

XII. *Classification as to Issues*

There are several possibilities:

1. A solution is worked out from knowledge of problem in the conditions described here and accepted by patient and parents. It may be:

(a) Removal from home: in conjunction with social service; the question is considered of whether foster home or institution is most suitable in the given case. If separation is deemed necessary, care must be exercised that it is not interpreted by the child as punishment since it would thus defeat its end.

(b) Return to the home—with or without followup (psychiatrist, social worker, or both) this being determined by the emotional status of the child at time of parole or discharge, and the knowledge of his capacity for full or restricted adjustment.

2. The solution is rejected by parents. It is sometimes necessary to let the child go home, even though it is felt that he cannot make a satisfactory adjustment, since parents, owing to the relative improvement in the home during week-ends, may believe child

to be "cured"; in this case the child can be sent home on extended leave, and it will be assumed that parents will later be convinced of the need for further hospitalization.

No satisfactory solution can be worked out, due to the chronic character of illness, in which case the child is transferred either to another institution, or back to his home under supervision of the out-patient department or some outside agency.

XIII. *Chances for Adjustment in Family Background Depend on*

1. Severity, type, duration of problem on admission.

2. Degree of improvement in neutral environment, from the point of view of habit, behavior, affective relation to the environment, and interest in activities and persons therein. This is a mooted point of hospital therapy, as opposed to therapy in the clinic or the office, and while the failure to adjust is of great significance, the capacity to do so is by no means an adequate index of the capacity to adjust on the outside, since the latter does not depend entirely on the child's reactions, but also on factors in the environment which may be little, or not at all, modifiable.

3. Degree of insight obtained by the child. This point has been considered under the various techniques studied.

4. Severity of environmental pathology; the most difficult situation being apparently that of pathological mother-child relation, as has been related from time to time in these notes. The parents' ability to gain insight into the motives of their own behavior is less than is the child's, and more than intellectual understanding is required. Under this heading belongs a fairly large group of parents, usually exhibiting a compulsive type of behavior, who, for varying periods of years, have used various devices in dealing with the child's illness prior to admission (one child of six and one-half had received treatments for three and one-half years from numerous physicians, besides nine months of daily chiropractic sessions for progressive disorganization of speech). They usually begin by deluding themselves and others on the gravity of the initial situation, then, in time, face the problem, deal with it with a characteristic compulsive drive to run the gamut of all therapeutic possibilities. These parents find it very difficult to leave any responsibility to the hospital authorities. They are little or not at all ac-

cessible to social service contact and function. If the child shows some improvement under hospital conditions, the parents behave as if they resented this improvement, as if it demonstrated their own failure, and this is unbearable to them. These are the parents who spend a good part of the child's home visits threatening him with the possibility, indeed the inevitableness of recurrence, of former behavior or symptoms, hence the child's anxiety.

5. Actual open uncooperativeness of parents.

6. Changes in economic conditions. Even if the child is capable of emotional adjustment under previous home conditions, it has been seen that the sudden loss of father's position for instance, and ensuing consequences on the family's emotional status may have a disastrous repercussion on the child's recently acquired and none too firmly established affective balance.

7. Stability of background: while some developments (death or illness of close relatives, etc.) cannot be foreseen nor avoided, others can be controlled and kept in mind for instance, in several cases, a change of residence at the critical period of readjustment at home has been instrumental in precipitating a relapse.

8. Possibility of adjustment in the outside school: again the hospital school represents an ideal seldom attained in the average public school and adjustment in the former is not an absolute index of capacity for adjustment in the latter setting. The school must be picked judiciously, especially for those children in the low normal intellectual range who show special interests and abilities and for whom activity and other special classes are indicated and available; in many cases the social worker makes a visit to the school, in anticipation of the child's discharge, to arouse the teacher's interest and call her attention to the child's peculiarities, special talents, etc., though the danger of meeting with a teacher who could thereafter focus on an oncoming and unavoidable recurrence is not to be overlooked.

9. Possibility of followup during the transition period of readjustment at home.

XIV. *Conclusions*

Information regarding children's psychiatric problems, at the present time shows a dearth of accounts of spontaneous expression,

the value of which cannot be overrated. It is felt that, alone, description of behavior and emotional response in a known environment, while valuable in itself, gives only partial and superficial information. On the other hand, children being, more than adults, suggestible and amenable to the influence of certain adults under certain circumstances, it is probable that some of the material available reflects suggestions or interpretations given in the course of therapy as much as the child's unadulterated expression. From the point of view of investigation and systematic collecting of data for present and future reference, it is desirable that suggestions and interpretations be eliminated, but, if introduced for therapeutic purposes, that they be limited to interpretation directly derived from the child's spontaneous productions and entered in the record as such.

In working out the several techniques described in this series of papers, efforts have been made to avoid suggestion. On the other hand, it has been pointed out that in two of them (use of a knife—collective phantasy) an element of suggestion is introduced: in the first case, suggestion of affect through directed use of an implement of aggressiveness, in the second, group suggestion by release of affect in a special setup, and that it has made possible a comparison between reactions obtained through the various methods.

The object of this writing has been, not only to present techniques and show that there exists a working relation between them, but also to establish their relation to the total picture, under hospital conditions. The necessity to study dynamically all aspects of the total picture in the light of material obtained directly from the child, and vice versa, has also been stressed.

In reviewing the material brought out spontaneously by the children, one gains the impression that the problem of aggressiveness and its sublimation may be the most important to solve, that from the point of view of tension release alone, it is relatively indifferent which channel, suggested or not, is opened, since the child will utilize for this purpose any setup offered him, but that he also seeks specific expression and that for the benefit of study of causes, it is preferable to provide him with methods which will give him such an opportunity for specific expression.

Bachrach

DR. JOHN H. TRAVIS

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Dr. John H. Travis, acting medical inspector for the Department of Mental Hygiene, has been appointed by Commissioner Tiffany to the superintendency of the Willard State Hospital, the appointment to become effective January 1, 1938. He succeeds Dr. Harry J. Worthing, who was transferred to the position of superintendent of the Pilgrim State Hospital.

Dr. Travis was born in Courtland, Ontario, April 15, 1889. He received his medical degree from the Faculty of Medicine of the University of Toronto in December of 1911. Following service in Massachusetts hospitals, the Canadian Army Medical Corps and in the state hospital at Augusta, Me., he entered the service of the State of New York as assistant physician in the Buffalo State Hospital in August, 1922. He was advanced to senior assistant physician in February, 1923, and to clinical director of the Creedmoor State Hospital in December, 1928. On January 1, 1933, Dr. Travis was appointed first assistant physician at the last named institution, in which position he served until September 15, 1937, when he became acting medical inspector.

On March 2, 1920, Dr. Travis married Louise Russell of Boston, Mass. He has been a fellow of the American Psychiatric Association since 1926. The PSYCHIATRIC QUARTERLY congratulates him on his well-deserved promotion.

BOOK REVIEWS

Will Therapy: an analysis of the therapeutic process in terms of relationship, and **Truth and Reality:** a life history of the human will. By Otto Rank. Both books translated from the German by Jessie Taft, of the Pennsylvania School of Social Work. A. A. Knopf, New York, 1936. 292 and 193 pages, respectively.

Impartial students of what has been called "the house that Freud built" cannot fail to recognize that its foundations are reasonably solid. That the superstructure must needs undergo a certain degree of tearing down and rebuilding is not surprising, since it is inherent in the scientific spirit to go on endlessly perfecting, without blindly destroying, useful basic concepts. The two books under review here are representative of nothing so much as of a chaotic hair-splitting, withal they are the results of prodigious thought. It must be said, however, in warning to the reader, that he is on the threshhold of no casual experience, in which the writer's ideas will come gently flowing in, but is rather faced with a task of deciphering whose logilal goal is headache.

Witness the following labyrinth of thought, culled from pages 45 and 46 of the book listed second above:

> At all events, to correct always seems easier to me than to prevent or to educate, particularly because there is a natural tendency to self-healing, yes, even to over-healing (in Ostwald's sense), while the tendency to self-education if it exists, at all events is much harder to awaken and to develop, as it presupposes on the part of the individual the acceptance of his own will . . . (*ad infinitum*)

The foregoing concludes a chapter in which Rank asserts that "one must be ready to admit that the morality lying at the bottom of this therapy (Freudian analysis) is the Jewish-Christian morality which it seeks to conserve." This ought to give Freud a twinge of perplexity, when he discovers to his dismay that he is regarded (by this writer, at least) to be a bluestocking among psychopathologists.

One is reminded as he plods through these nearly five hundred pages, of having sat through a big tennis match, and of following the ball first to the left, then to the right, back and forth, until a sort of hypnosis prevails. Rank first states (or misstates, as the case may be) a Freudian tenet, then he applauds it, then makes an exception to it, then rejects it forcibly; there follow some phrases wherein he makes an excuse for Freud, and is con-

descending, but he always ends with some involved restatement of the principle, which statement is as elusive as the soap in the bathtub. For such thrilling adventure in the drama and comedy of logic, these books are heartily recommended; one might say, "Never a dull moment." Especially mystifying yet provocative is a chapter entitled "Knowing and Experience." Here Rank tilts with Biblical windmills with the obvious purpose of having Freud tangled in a snarl of mythological reasoning.

Mark you well, this author is no mean verbal opponent. The wonder is not that he produces such complexities of thought, but that he actually finds measures to extricate himself from a good many self-condemnatory pronouncements. In these writings you will find narcissism worked out to a fine art. For sheer mental calisthenics, the books should be widely read, but few are they who will tread the rocky path along with the author.

Praise is due Dr. Taft for a splendid job of translation. For the reproduction of these enigmas, more is required of the translator than multilingual facility: an acquaintanceship with the Rankian belvedere, a broad view of the field of psychoanalytic thought, and a fidelity to logical phrasing. Dr. Taft makes full use of such talents to produce a scholarly version of the original of these books.

The Mind of Man. The story of man's conquest of mental illness. By WALTER BROMBERG, M. D. Harper and Brothers, New York, 1937. 293 pages, plus bibliography and index. Illustrated. Price $3.50.

In this excellent historicald ocument, Bromberg makes it possible for intelligent persons to fix in their minds the striking contrast between the old and the new in the realm of mental disorder and its understanding. The thorn-ridden path through the morass of mysticism to the open field of science is delineated in these pages with skill and vigor. There are ample quotations from centuries-old texts, and illustrations from Hogarth and others. In the course of the narrative there prevails a temperate judgment that such things just had to be in a society so controlled by tradition and so infested with blind superstition. Good men and true there were, to be sure, but the great pity is that the charlatans outnumbered them.

Of necessity, much of the earlier portion of the book deals with the evolution of physical medicine as much as it touches upon ancient concepts of mental processes. The centuries prior to the Renaissance indeed offer us little of enlightenment in psychology, chiefly because scholars were cramped with a worship of Aristotle. Furthermore, quietly though science-in-the-bud had to tread in its investigation of the body, how much more stealthily must it approach the mental life.

We read, in Chapter V, that "the devil lost dominion over the insane when about the seventeenth century "witchcraft showed signs of forthcoming disintegration." Your reviewer would like to share the optimism that this implies for our own era, but he cannot ignore the fact that demonological concepts still make themselves felt. Great strides have been made, and they are herewith applauded, but mankind is in general a long way from an optimum realization of natural cause and effect. The education of the race, no less than that of the individual, must go on endlessly. Books such as this one of Bromberg's give us hope for the future.

An interesting comment is made in Chapter VIIII ("The Latter-Day Faith Healers"):

> It avails nothing to rant against the acceptance of blind . . . faith in preference to the precision of modern medicine. Our knowledge of the human mind is yet embryonic. Besides, there is a time factor involved in the substitution of science for faith. The time lag between the intellectual appreciation of established facts of science and their emotional acceptance is long. It was during such a prolonged period of latency that the latter-day faith healers mushroomed.

There follows an absorbing chapter on those scintillating characters of the nineteenth century, Noyes the perfectionist, the Fox sisters, Mary Baker Eddy and Phineas Quimby, the Rev. James Alexander Dowie, and others.

General readers will learn in a manner far from dull, of the beginnings of modern psychotherapy. Pinet, Charcot, Freud, to mention only a few, are introduced, their theories are discussed without prejudice, and their individual influence upon the science "of the mind" is adequately put forth.

Bromberg is intolerant of nothing but intolerance. His book deserves wide reading. It is a distinct contribution to public education, and splendid diversion in the bargain.

Juvenile Paresis. By WILLIAM C. MENNINGER, M. D. Williams and Wilkins, Baltimore, 1937. 199 pages, bibliography and index. Price $3.00.

This monograph fulfills the purpose for which it was intended, but adds little to the general fund of medical information. The authors' writings and studies of most of the features of juvenile paresis, supplemented by observations drawn from a vast literature, are brought together and are fairly up-to-date. The presentation is objective, concise and logically arranged. Well-chosen case records are clearly and briefly abstracted to illustrate the material of the text. A worthwhile feature of the volume is to be found in

the appending of a summary to the end of each chapter, wherein all the important facts are adequately condensed.

The mass of numerical data given in the first two chapters is occasionally confusing; it might be said in this respect that throughout the book the relative importance of statistics is overemphasized. Another source of confusion is the manner in which figures and dates are presented and references cited, as the numbers intended for these different purposes are frequently found together. The author's recognition of the difficulty of collecting and appraising statistical information bears out that general tendencies are all that may be indicated, and that the consideration of each patient must be individual in the light of statistical trends.

A noticeable omission is an evaluation of mental deficiency in parents as related to hypophrenia in the offspring, particularly as this condition appears so frequently in these children, and especially since most of the other factors having a possible relation to or incidence in juvenile paretics, are considered.

The descriptions of the physical, mental and clinical features of the disease are practical and pointed. The generalizations concerning the psychological interpretation of psychotic manifestations are tenable. A consideration of the more recent and sensitive precipitin tests for syphilis is neglected though this would seem important since a Wassermann examination may miss a weakly positive reaction. Despite the acknowledgment by the author of extremely poor therapeutic results, it is surprising that the necessity and possible benefits of preventive or prenatal treatment should not have been mentioned.

An interesting pathological discussion completes the book, and an extensive bibliography is appended.

The Neurotic Personality of Our Time. By KAREN HORNEY, M. D. W. W. Norton and Co., Inc., New York, 1937. 299 pages. Price $3.00.

Readers who are familiar with Dr. Horney's writings will turn with interest to her new book depicting the neurotic constitution. It is not a treatise on psychoneuroses, but a discussion of personality characteristics of the psychoneurotic. We do not find a reference, for example, to anxiety hysteria, but there is much about anxiety, its sources and protean manifestations. Indeed, as one reads the lines and between them, anxiety is stressed as the chief characteristic of the neurotic personality. This trait together with poorly sublimated narcissim doubtless gives expression to most of the obvious behavior patterns in this type of individual.

Dr. Horney, for the purpose of her presentation, has avoided separating the group into clinical entities or types and they are not entities in the true meaning of the term, yet textbooks and lecturers have made it appear that they are. She avoids becoming involved in this ambiguity by ignoring any classification of psychoneuroses and concentrating her attention upon the neurotic himself. Some one should perform the same service for psychiatry. The flair for classification tends to focus attention upon trivialities and leaves the basic factor, the individual himself, without adequate consideration.

The author is a well-known psychoanalyst and follower of Freud, but believes that in building upon the foundation laid by him she is justified in stressing her own conclusions and not confining herself to Freud's interpretations, saying in substance that she has gone beyond Freud. The reviewer would modestly warn her to beware. Others have chosen such paths and eventually found themselves in difficulties. She concludes that he is in error for having overemphasized the biological origin of mental characteristics. He has remained rooted in scientific orientations. For his disregard for cultural factors, he and his followers have been led into a blind alley where they are enshrouded in a rank growth of abstruse theories. As far as your reviewer can perceive, this has all come about from the emphasis which he places upon the Oedipus situation and sibling rivalries—the family romance, and his teachings of the psychology of women; but Dr. Horney objects also to the emphasis which he places upon the sexual instinct, and would substitute anxiety in its place.

These criticisms do not detract from the value of the book. If her psychology may be thought by some to be unsound, others will hail her as a prophet to whom they will gladly do honor. For the general medical reader the book has much to offer in the way of understanding the neurotic, his moods and trends. Its perusal will give him some new light perhaps or at least a different slant from which to view the developments taking place in the field of mental hygiene.

Personality and the Cultural Pattern. By JAMES S. PLANT, M. D. The Commonwealth Fund, New York, 1937. 432 pages with index. Price $2.50.

Under this title Dr. Plant has written a thought-compelling book—one which deserves the consideration of every individual concerned with the field of mental maladjustments. It should prove especially interesting to those who believe that the principles of mental hygiene should be more widely applied to our social institutions.

The author first states and fortifies his hypothesis, namely "that personality and environment are mutually impinging sets of forces and that there is a constant stream of action and interaction in which each new pattern reacts in turn on its determinants." With that as a foundation, he proceeds to a critical examination of present concepts arriving at the working conclusion that they are probably too narrow and too individually centered for other than ameliorative solutions to what are comparatively minor and temporary symptoms of a deeper personality-culture maladjustment. The study of personality difficulties had led from the adult to the child and now to the parents and the schools. Therapeutic efforts have swung from modifying environments to modifying personalities with results which are not overencouraging. It seems only reasonable to assume, as does Plant, that only when we come to understand more fully the active components of the impact of personalities on the cultural environment and of the cultural pattern on personalities will we be able to deal effectively with the problems of maladjustment. It is stressed by modern psychiatry that the mind and the body cannot be considered apart but rather should be considered as one integrated whole in psychosomatic relationships. May it not be that this union of forces should be carried farther so that personality and environment instead of being considered separately should be integrated into a still larger whole—the personality-culture relationship?

The author enlarges upon this thought and applies it to the more prominent of our existing social institutions as they affect and are affected by the personalities with which they make contact. He considers the family, the school, recreation, law, social work, medicine, the church and industry. This portion of the work is particularly well handled, composed with an inquiring attitude showing no dogma and little bias and is based on a survey of present conditions rather than of classical traditions. Many more questions are asked than are answered and it is in this point in the opinion of the reviewer, that the greatest value of the book lies. For it is stressed that when we arrive at the point of examining the interrelationships between these institutions and personality, our knowledge is on the whole definitely insufficient. Here we find avenues of investigation and sources of information suggested as well as many pertinent questions asked, all in such a way as to provoke thought on the part of the reader. The trend of preventive psychiatry is toward penetration into other large social institutions to the same extent in which it is already at work in the schools. Before this can be effectively accomplished much thought and more knowledge are essential. Volumes such as the present one from Dr. Plant will help point the way for them.

The Principles and Practice of Clinical Psychiatry. By MORRIS BRAUDE, M. D. P. Blakiston's Son and Co., Philadelphia. 1937. Pages x-382. Price $4.00.

The author is a teacher of psychiatry and has compiled a textbook upon the basis of his lectures to medical students—at least one gains that impression upon reading it. His stated purpose is to relieve the bewilderment of the student resulting from the inchoate, controversial and uncertain position of psychiatry and to simplify such knowledge as is available. A most laudable purpose surely, but in carrying it out he might have gone further in eliminating more than he has done. Writers of textbooks are inclined to repeat older theories and the conceptions of earlier writers, even though they themselves entertain more modern and sounder opinions. The old is carried along with the new without indicating the distinction with entire clearness. Perhaps the reason is an intention to present the subject without bias of personal views, but the student and reader would welcome them. This may explain why on one page with reference to prognosis in schizophrenia he is led into the firm statement that its "progress is slow but certain deterioration and finally dementia" while on another page he speaks more hopefully, recognizing what is known to be true, that cases do recover, and speaks of cautious optimism in prognosis.

The last chapter is devoted to a discussion of the psychoanalytic point of view which shows him to be conversant with the newer psychology but his presentation of the paranoia syndrome includes no reference to homosexuality and the love-hatred component is not mentioned. The pathogenesis of paranoia is no longer seriously disputed and it would seem that the medical student should be able to grasp its significance and gain an insight which would be helpful with reference to psychogenesis generally.

One is led to refer to omissions like this because the author displays a comprehensive grasp of his subject and has prepared a book that is well arranged and suitable for students' use.

The Patient and the Weather. By WILLIAM F. PETERSEN, M. D., with the assistance of MARGARET E. MILLIKEN, S. M. Volume IV. Part I, including a chapter on Experimental Endocarditis by Alexander J. Nedzel, M. D. 654 pages. 1937. Edwards Brothers, Inc., Ann Arbor, Michigan. Price $10.00.

The present volume of Dr. Petersen's series of monographs subtitled "Organic Disease" continues his thesis regarding the validity of the ancient Hippocratic observation of the relationship between meteorological

alterations and clinical events. Certainly he is not disposed to urge weather as the sole and only etiology but as simply one important factor to which the patient must constantly adjust, be he of the asthenic or pyknic habitus and then with his own peculiar organization, and in his own way. Cell, tissue, organ and particularly cardiovascular physiology and the easy shift to pathological function with reference to anoxia is the basis for Dr. Petersen's interpretation.

Diversified case material, ranging through lobar pneumonia, lead encephalopathy, coronary occlusion, acute osteomyelitis, endocarditis, nephritis, etc., is correlated with appropriate meteorographs. Briefly, it is shown that clinical crises coincide with temperature drops and barometric crests by way of the pressor episode, inasmuch as it is the cardiovascular system (autonomically controlled) which bears the brunt of adjustment to the fluctuating environment. Further than that, the clinical events in several patients during the same meteorological shifts were shown to run parallel courses. Evidence is presented with reference to the kidney particularly, that "the self-same mechanism that precipitates the final clinical symptomatology is of significance in initiating the earlier disturbances of integration that ultimately cause the clinical entities that we recognize as disease."

Dr. Nedzel's very significant chapter on experimental endocarditis in dogs following an induced pressor episode is pertinent to the sections on endocarditis subjects.

Although no index is appended, the table of contents and the bibliography are full. Incidentally the publisher calls attention to the lithoprinting process used in the preparation of this volume, which is relatively legible and said to be inexpensive.

To this reviewer the book is somewhat marred by a sophomoric jibe at the psychoanalytical interpretation of a cited case, rather in the style and spirit of Dr. William Brady, the indefatiguable newspaper columnist. Otherwise the entire presentation is scholarly, scientific and well-documented with case material and reference to sound research. Dr. Petersen actually goes far beyond his original purpose, adds much to our knowledge of constitutional medicine and exhibits the modern medical point of view, expressed by Socrates, Hippocrates and Paracelsus and too-long forgotten. That is to say that in our laborious and endless accumulation of scientific minutiae we have lost sight of the man himself and of his constant internal and external adjustments.

The book is commended to physicians of any specialty and particularly to the neuropsychiatrist.

New Frontiers of the Mind. A story of the Duke experiments. By J. B. RHINE. Farrar and Rinehart, New York, 1937. 274 pages. Price $2.50.

It would be unworthy of the scientific viewpoint to dismiss without a hearing the claims of diligent investigators into those phenomena of human experience that tend to remain in the category of the imponderables. Consequently, the series of experiments described in Professor Rhine's book, emanating from the psychological laboratory of a recognized university, compel attention, if not agreement with the author's thesis.

The book is admittedly addressed to the layman, written in a style that ought to convince many of the uninitiated. The experiments discussed need no exposition here, for widespread publicity has made them almost household knowledge. As for the body of Rhine's book, it comprises a long-winded, insistent argument against the explanation of his samples of extrasensory perception on the basis of pure chance. With an eye to the general reader, however, the author has sprinkled his work here and there with anecdotal seasoning. Manifestly lacking is any statement of *total* experiments, *total* results, or any inclusive and comprehensive data of the seven years of dabbling in telepathy and clairvoyance. But the book is not addressed directly to the scientist, hence the easy manner of tossing aside such dreary statistical material.

Carefully chosen though the word "extrasensory perception" may be, the reader cannot escape its metaphysical implication. Professor Rhine makes plain his concept of this term when, on page 128, he says, "The trouble with this idea of a new 'sixth sense' is that the extrasensory phenomenon does not behave like sensation." Still, the good professor is in the last analysis ignorant of how it *does* behave; therefore, how can he be certain that it does not behave as do the known sensations? Make no mistake about his viewpoint in this regard, for he emphasizes at a later point in the book, " . . . it does not supernaturalize the mind simply to discover that it has some extrasensory capacities in the field of perception. No discriminating person, therefore, will view our findings as mystical, occult or supernatural merely because they are not based on sensory reports." A prerequisite to acceptance of Rhine's thesis, nevertheless, is the virtual ruling out of biological interpretation; this, the reviewer is unwilling to do and yet he does not feel that he is "blinding himself to any of the facts because of the extreme antimystical terror to which many scientists are subject."

It is indeed a challenge to the imagination to ponder what might be the effect upon psychopathological concepts, were the author's enthusiasm for extrasensory perception universally shared, and were his experiments

transferred from the narrow scope of card-guessing to the more complex aspects of human experience. We should have to refabricate the entire structure of clinically obtained knowledge of human nature.

True it is, that we often adopt a defeatist attitude when confronted with the strange tales of extrasensory perceptions that are bruited about. Admitted it is, that frequently one can say only, "I cannot explain it, but there must be some explanation on a natural science basis." Yet this is not, as Rhine suggests, an attitude of smug satisfaction that the riddle of the universe has been solved; it is merely the caution that must attend every search for knowledge. We must recognize, for example, that when the subject of an experiment makes his response (that is, "guesses a card"), in order even to utter the words "circle," "star," or what not, a neural path must have been excited; this neural path, traced in reverse, would eventually reveal a definite original stimulus or combination of stimuli. If this is too mechanistic a viewpoint, then let us say that *something within the range of the subject's experience* would have to touch off the spark. To seek other sources of an individual's behavior is to court the existence of a yet unrecognized sense (a reasonable conjecture, but one which Rhine will not entertain), or to pursue a pseudoscientific will-o'-the-wisp.

In the nature of a postscript to the above, the reviewer cannot resist the impulse to record here that the E S P cards are now obtainable on the counters of certain red-front department stores; also, that a radio manufacturing company is sponsoring extrasensory tests on the air!

An Introduction to Psychological Medicine. By R. G. Gordon, M. D., D. Sc., F. R. C. P. (Ed), N. G. Harris, M. D., B. S. (Lond), D. P. M., and J. R. Rees, M. A., M. D., D. P. H. (Camb). Oxford University Press, London, 1936. 373 pages and index. Price $4.00.

There are in this book no flights of fancy in defense of insupportable doctrines, nor is there on the other hand a preoccupation with a strictly organic interpretation of every foible of human conduct. The authors have turned out an understandable text which should prove of value to medical students. Its plan is admirable; to quote from the preface; "The general arrangement of the book envisages that the student shall receive four or five lectures in psychology in connexion with his courses in physiology immediately after he has dealt with the physiology of the nervous system; three or four lectures on psychopathology in connexion with the teaching of pathology, and that in his final year, he should receive five lectures on the Psychoneuroses, eight lectures on the Psychoses and two on Mental Deficiency."

Following a few introductory pages on the relationship between physiology and psychology, the discussion is launched upon a consideration of Psychological Organization, which the authors define under the well-known framework of cognition, affection and conation. Under the last named, "appetite" and "instinct" are offered as distinct basic elements; the former seems to be handled judiciously, but the latter conveys the impression of a certain amount of duplication. One wonders, for example, why food-seeking instincts must be listed apart from hunger (an appetite), and why self-assertion, so interwoven with aggression, is however listed as an independent instinct. The reviewer feels that the authors have leaned heavily upon MacDougall in this phase of their discussion, but perhaps this is only quibbling about the matter of presentation. This section of the text winds up with an excellent chapter on Personality—the Complete Organization.

Subsequent divisions of the work are in accord with the outline stated in the preface, being devoted successively to psychopathology, psychoneuroses, psychoses and mental deficiency. In the first of these one encounters an exposition of underlying mechanisms (conflict, repression, abreaction, regression, the dream, and so forth), followed by two chapters on the psychopathology of common symptoms. This approach is commendable, for it provides a transitional stage of study before entering upon the consideration of the clinical entities to be treated in later chapters. The classification of the psychoses is based on that suggested by Meyer, and its brevity should make available to the medical student a fairly cohesive picture of the nature of mental disorder.

There is nothing abstruse in the style. The authors offer a readable and instructive introduction, an unbiased presentation, a preview to the intelligent understanding of human nature that should come ultimately to every physician who would be more than a dispenser of materia medica. Advanced students of psychology could use the book with profit, for although certain of the theses presuppose some medical knowledge, a little reference work will pull the neophyte through any difficulties; furthermore, there is need for the products of the psychology laboratory to be tempered with the current of life that courses through clinical experience.

The Problem of Anxiety. By SIGMUND FREUD, M. D. Translated by Henry Alden Bunker, M. D. W. W. Norton and Company, Inc., New York. 1936. 165 pages. Price $2.00.

This is not the first time this monograph has appeared in English, but it is welcomed as a new translation and which does better credit to Prof.

Freud's lucid style. His scientific conscientiousness, his refusal to draw conclusions beyond the limit of the evidence, his critical attitude towards his own conclusions gives the reader almost the same feeling as if he were engaged in an amicable discussion with the learned investigator. This, it has seemed to the reviewer, is the charm which distinguishes his writings. He takes the reader into his confidence, lets him see the steps by which he makes progress in the development of his theme and reaches a conclusion. When his conclusion is tentative or incomplete he does not leave the subject until he has pointed out the deficiencies. Indeed there is no intelligent and understanding critic of Freud more ruthless than himself.

In an addenda he has restated some of his earlier views upon the basis of added experiences.

Dr. Bunker is to be congratulated upon his excellent translation, in which the author's delightful literary style is fully retained.

Der psychische Restitutionseffect. Das Princip der psychisch bedingten Wiederherstellung der ermudeten, der erschopften und der erkrankten Funktion. (The principle of psychic restitution. The principle of the fatigued, exhausted and diseased functions of mental stimuli). By Otto Lowenstein, Clinic La Metairie, Myon, Switzerland. Benno Schwabe and Company, publisher, Basel, 1937. 192 pages. Paper bound. Price 8 francs (Swiss).

The problem of fatigue of various functions of the nervous system and the compensating effect of mental stimuli on the fatigue is studied and discussed. The light reflex of the pupil, which is considered as the prototype of a vegetative reflex, is chosen as the object for the experimental studies. By means of a special method inaugurated by the author, which permits exact registration, the effect of fatigue on the reflex is investigated in detail and seven stages of fatigue are differentiated, the one extreme being the normal reaction to light and the other, the complete loss of reaction. The fatigue can be considerably diminished or completely abolished by intervening mental or sensory stimuli; for example, fright, joy, pain, et cetera. So the fatigued pupil shows again a normal light reflex, or, at least, returns to a stage of less pronounced fatigue. This is called the "principle of mental restitution." The findings, which are illustrated by graphic registrations, are the result of very thorough experiments, the method of which is described in detail. Evidently this monograph is a continuation of the author's former studies on pupillary functions and disturbances. Mental-restituting effects, similar to those seen in the case of the fatigued function, can also be observed in cases of damaged function; damaged, that is,

by organic lesions in the nervous system (lues, encephalitis). The presence or absence of the effect is said to be an indicator for the severity of the organic damage and for the improvement which can be expected. It is, therefore, of practical importance for the prognosis of organic neurological conditions.

It is the author's opinion, that the effect is not limited to the light reflex of the pupil, but that it is a general principle effective in all functions of the vegetative nervous system. It is interpreted as a reflex mechanism of the sympathetic system and is considered as a regulating connecting link between psyche and soma. The effect is believed to counteract the exhaustion of vegetative functions, and thus to render possible the continuation of life. Not only external mental or sensory stimuli are able to produce the effect, but also the stimuli arising spontaneously within the individual's own mind.

The problem discussed seems to be too theoretical and specialized to be of interest for the practitioner, but it ought to be a valuable stimulation for the physiologist and the neurologist.

NOTES

The fifteenth annual meeting of the American Orthopsychiatric Association will be held at the Stevens Hotel in Chicago, Ill., February 24-26, 1938. Communications should be addressed to the secretary of the association, Dr. Norvelle C. La Mar, 210 East 68th Street, New York, N. Y.

—The fifteenth annual meeting of the Academy of Physical Medicine was held at the Hotel Walton, Philadelphia, October 19-21, 1937. In addition to lectures and the general program, demonstration clinics were held at the hospitals of the University of Pennsylvania, the Jefferson Medical College and Temple University.

—The New York City offices of the State Department of Social Welfare were removed, on October 7, to the Bartholomew Building, 205 East 42nd Street, New York City. The telephone number is MUrray Hill 4-5001. Other offices which will be grouped at this new address are those of the suburban area office of the department, the division for the blind, the division of State charges, and the local office of the Warwick State School for Boys.

—Dr. Harry J. Worthing was transferred to the superintendency of the Pilgrim State Hospital, effective December 1, 1937. Dr. Worthing, who had been first assistant physician at the St. Lawrence State Hospital until his appointment as acting deputy medical inspector on May 1, 1933, was appointed superintendent at the Willard State Hospital on January 1, 1935. At Pilgrim, he succeeds Dr. William J. Tiffany, Commissioner of Mental Hygiene of New York State.

—The New York State Psychiatric Institute and Hospital will again offer to qualified graduate nurses a course of eight months in psychiatric nursing. Nurses who have already had three or four months in psychiatric affiliation are to be given preference. The class will be admitted on February 1, 1938. Detailed information can be obtained by addressing the director of the institute, Dr. Nolan D. C. Lewis, at 722 West 168th Street, New York, N. Y.

—More than thirty-five hundred delegates attended the sixty-eighth annual meeting of the American Public Health Association, held October 5-8, 1937, in New York City. Every state in the Union was represented, as well as many foreign countries. Of interest to readers of this journal were (1) a resolution supporting the development of more adequate diagnostic services for the control of syphilis and (2) a resolution pledging active support

for measures which seek to secure better maternal and neonatal care. The 1938 meeting will be held in Kansas City, Mo.

—The second national Social Hygiene Day will be observed on February 2, 1938. Emphasis will be laid upon the prevention of syphilis, the enemy of youth. A special poster designed by the State Charities Aid Association, urging every expectant mother to go early to a physician for an examination and blood test, will be displayed in 22 states, starting in February, with the cooperation of outdoor advertising companies; this poster has been adopted by the American Social Hygiene Association in its nation-wide program.

—The people of New York State are to be congratulated on their demonstration of a humane spirit in approving the forty million dollar bond issue for State institutions. It is worthy of mention that while the favorable vote on this question was smaller proportionally to that on two previous bond issues, this occasion came on the heels of enormous demands for various relief funds; also, that comparatively little publicity preceded the request for this appropriation. The moneys thus secured may be appropriated by the Legislature any time between January 1, 1938 and July 1, 1940, for the construction of State hospitals, schools for mental defectives and State charitable, health and correctional institutions. It is expected that a substantial portion of this sum will be allocated to the Department of Mental Hygiene.

—Founder's day exercises were held at the headquarters of the State Charities Aid Association in New York City, on Wednesday, December 15, 1937, as a tribute to Louisa Lee Schuyler, who organized the association in 1872. The following excerpts are taken verbatim from the December issue of the *S. C. A. A. News*:

"Mr. Folks told of the visit of Miss Schuyler and her sister, Georgina, to the almshouse of Westchester County in 1871 where they found the sick, the physically well whose only handicap was poverty, the young, the old, the disorderly, the insane, and the feebleminded, all jumbled together in one hopeless mess of misfortune . . . Perhaps the achievement which insures Miss Schuyler's place among the immortals more than any other was her unrelenting ten-year campaign to have the insane removed from local poorhouses and placed in State hospitals . . . The bill fixing New York State's responsibility for the proper treatment of these wards was introduced at each session of the Legislature for several years until, due to Miss Schuyler's untiring organization of public support . . . it was passed in

1890 . . . This Act with its definite provision for psychiatric treatment of the mentally unfit has come down to this day with surprisingly few changes, and has served as a model for many states in the Union."

—The American Physicians' Art Association, a national organization of medical men who have ability in the fine arts, will hold a first national exhibition in the San Francisco Museum of Art, San Francisco, Cal., in June, 1938. (The American Medical Association Convention is June 13-17 in the same city.) Entries are to be accepted in the following classification: oils, watercolors, sculpture, photography, pastels, etchings, crayon and pen and ink drawings (including cartoons), wood carvings and book bindings. Scientific medical art work will not be accepted. The exhibition is not limited to first showings. All entries close April 1, 1938. Any physician interested should communicate at once with the Secretary of the American Physicians' Art Association, Suite 521-536 Flood Bldg., San Francisco, Cal.